The Builder.

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The Architecture of Our Large Provincial Towns.

XVIII.—NEWCASTLE-ON-TYNE.

A COMPARISON of the past and present of almost any of our large towns brings more forcibly before one's mind than, perhaps, anything else the astonishing difference between the activity of this century and the somnolence of the middle ages; a difference which one is frequently tempted to regard as something more than one of degree simply. At any rate, the acceleration of progress is very much like that which occurs when a great river, after flowing in an almost level bed, reaches a precipice. Newcastle is not the most striking example of the change that could be quoted, but its development is sufficiently remarkable. The maps of the last century show it as still a mediæval city, practically confined within the walls built by Edward I., and covering, say, a quarter of a square mile, a full third of which was taken up by gardens and open spaces. Now, Newcastle (exclusive of Gateshead) is a town of nearly 200,000 inhabitants, and covers ground measuring about three miles from east to west, and a mile from north to south. Important and prosperous as it was, its more than six centuries of life had only brought it to about one-twelfth of its present size. The interesting but insignificant little brick houses on the quay, and the picturesque but trumpery-looking timber and stucco ones in the "Sandgate" and the "Side," were the principal business premises of those days, and bear a similar proportion to the lofty, spacious, and solid stone structures of the modern city.

Though Hadrian's wall passed over the site of Newcastle, and the Romans had a fortified camp there and a bridge over the Tyne, the town really owes its foundation to William the Conqueror, at whose instigation Robert Courthose, his eldest son, founded the castle—the New Castle—around which it grew up. The site is similar to many others on which great cities have arisen—the slope of a hill facing south, with a river at the foot. The slope in this instance is very steep at the bottom, and was, no doubt, originally much steeper; and there were protecting ravines on the east; one against the castle wall, and overlooking another of which the eastern town wall was afterwards erected.* Along the river bank is a narrow strip of low-lying land on which the quays are formed and the buildings facing them erected; but the greater part of Newcastle lies on and above the steep slope and facing the similarly-placed Gateshead, with which it is connected by several bridges, notably the remarkable two-storied one which, built on lofty stone piers, carries a high-level roadway between the girders, and the railway above them. It is not, perhaps, a very beautiful object in a strictly architectural sense; but it is an honest, straightforward piece of structural work, without any cast-iron architectural detail or silly stone mask, and, soaring as it seems to do through the air, far above the water level, it is a more than ordinarily striking object.

The growth of the town has been, and still is, mainly east and west—west especially. On the north side the open spaces called the Castle Leazes, the Nun's Moor, and the Town Moor—public parks and recreation grounds—have prevented any large extension in that direction. The principal residential quarters are on the north-east side and in the western suburb of Elswick. Brick of several kinds and a coarse sandstone would appear to be, almost equally, the available local building materials. The principal modern commercial buildings of the central city are stone-faced, with but few exceptions; but the older structures, and domestic and suburban ones, are almost all of brick, with or without stone dressings, while the local sandstone is used for garden and enclosure walls and many old cottages. The common bricks are unusually pale in colour, and white bricks, similar to Suffolks, are largely used in the better class of work; but, whatever their colour, all the bricks are of large size, from $3\frac{1}{8}$ in. to $3\frac{1}{4}$ in. in net thickness.*

In considering the buildings of Newcastle in detail one may appropriately begin, as the town itself did, with the Castle. Its remains are a short distance north of the river, in the southern part of the chief business centre. They consist of the keep (Fig. 1), the lower part of the main gateway, and a fragment of the southern garth wall, containing a postern. The keep is of moderate size only, measuring externally about 60 ft. from north to south, and a little less from east to west, exclusive of the slight projection of the angle turrets and the fortified stair and platform giving access to the entrance on the east. The parapets and upper part of the turrets have been badly restored, and their present

* This second gulch appears to have been cleverly made use of in forming the north-east railway cutting. But at the present time a third, a branch of that in which the Ouse Burn flows, having come within the area of building, is being used as a "pitch" for refuse, apparently with the idea of filling it up eventually and, probably, building upon it!

* In this connexion it is curious to notice how burnt bricks seem to have a tendency to get thicker as the world grows older. The Roman "testæ," greatly as they varied in thickness, rarely much exceeded $1\frac{1}{4}$ in.; the mediæval bricks ran about $2\frac{1}{4}$ in.; in the seventeenth, eighteenth, and early part of the present century, $2\frac{3}{4}$ in. was the rule; now, at any rate in the Midland and Northern counties, $3\frac{1}{8}$ in. is the commonest thickness.

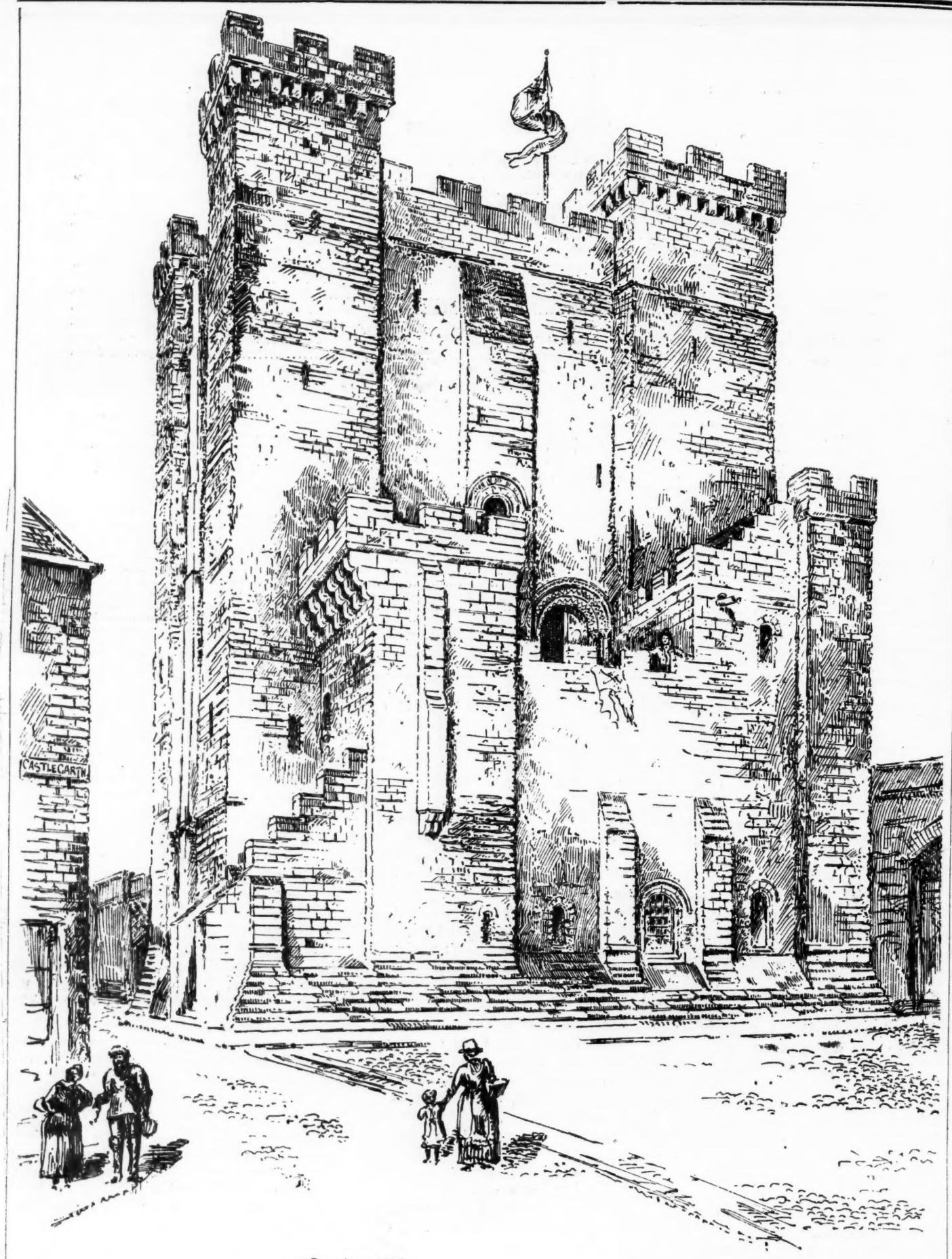

Fig. 1.—The Castle: from a Sketch by Mr. W. H. Knowles.

appearance destroys the character of the building; the buttresses in the middle of the north and south faces, which probably only reached to about half the height of the building, at any rate in their full projection, have been built up to the top; and many of the small windows have the appearance of being modern, and probably take the place of still smaller openings. There is a wide, spreading plinth, not, as is often the case, in one slope, but consisting of a series of splayed courses surmounted by a large roll moulding laboriously formed on a stone much thicker than itself. The main entrance is at the level of the third story, and is reached by a steep stairway, which passes through a fortified gateway, and is overlooked by a parapeted platform at the head. The entrance doorway is said to be a careful copy of the original, which in that case was an elaborately carved piece of Norman work of probably later date than that given for the foundation of the building. The great hall of the keep, to which this door gives access, is surrounded by the usual small chambers; the well is in the north-east turret, and the stair in the

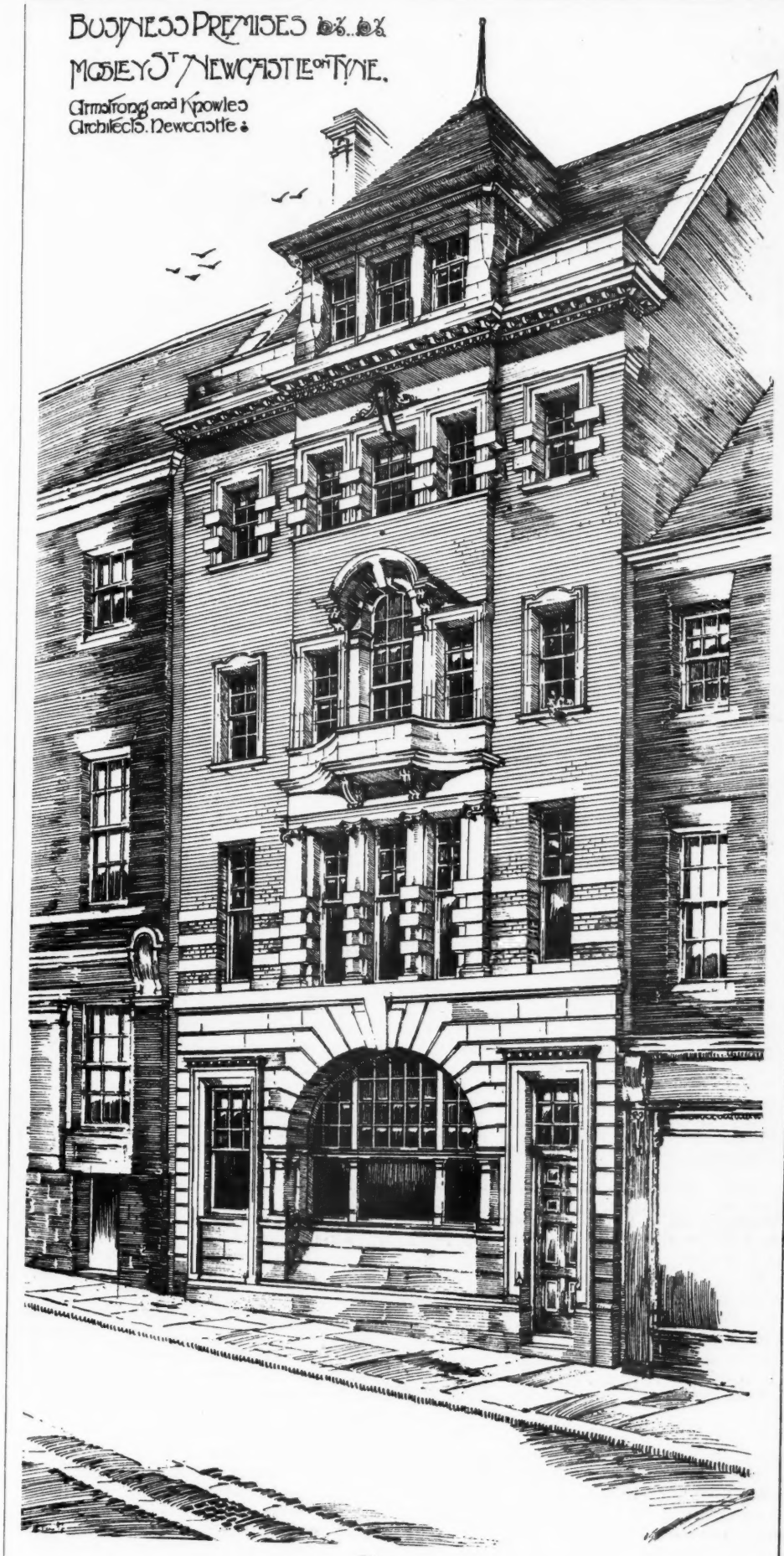

Fig. 2.

south-eastern one. The hall is now covered with a barrel vault, but was probably originally ceiled at a lower level and had another chamber over it. The bed-chamber or retiring-room has an interesting recessed fireplace which is no doubt original; the one in the hall is modern, but is surrounded by a curious carved wooden chimneypiece of the seventeenth century, from an old house in the town. The floor below the hall is now used as a library; the middle chamber has a central column supporting two transverse arches to carry the floor above, and in the retiring chamber is another original fireplace. On the walls are hung many plans and engravings of old Newcastle. The lowest floor is perhaps the most interesting. The guard chamber is curiously vaulted from a central shaft which carries four diagonal and four transverse arches of plain section, and all semicircular (or meant to be so) the transverse ones springing, of course, at a higher level than the others. The chapel is formed beneath the entrance stair and platform and, as usual, is an elaborately ornamented chamber. It consists of what may be called a short nave of two bays, separated by an arch from a chancel of one, rather larger, bay with a side recess. It is all covered with quadripartite vaulting on heavy moulded and carved ribs and the walls are arcaded, the arches being ornamented with rich chevrons; the planning and arrangement of this lowest floor with reference to the water supply, the sally port, and other matters, is very interesting and shows the care and prevision of our ancestors in military matters. The Keep stood within a comparatively small inner court which itself occupied the north-west corner of the greater one, the wall of which followed the outline of the hill, except upon the west, where the ground was comparatively level and where it was protected by an artificial moat. This moat returned a short distance round the north side, and between it and the steep slope of the hill at this point was the main entrance, with three successive gateways, the middle and chief of which was the structure now called the Black Gate. Its pointed arches and general appearance bear out the statement that it was built about 1247, though it has undergone various alterations since it ceased to be useful for defence. The mullioned windows, internal doorways, and fireplaces are no doubt sixteenth century insertions, and the upper part has been entirely rebuilt, while an extra arch has been turned between the buttresses which projected from the front, and on it a bay making recesses in the upper rooms has been formed. The gateway seems to have been arranged for a pair of doors within the portcullis. The masonry is rather more closely jointed than that of the Keep, but the courses are of the same height, averaging, that is, about 8 in. The upper rooms are used as a museum, and contain, besides the usual miscellaneous collection, a number of interesting Roman altars and monumental stelæ. The postern on the south is an arched gateway, about 5 ft. wide, in a wall 11 ft. thick, capable of being closed by a portcullis.

The North-Eastern Railway now passes between the Keep and the Black Gate, and crosses, on a lofty viaduct, the street called the "Side," that hugs the foot of the Castle hill on the east. The triangular space, called the "Sandhill," at the bottom of the Side, was evidently the chief business centre, as it is still an important one, of the old town. Here still stand, between it and the quay, the Exchange, or "Merchants' House," and the Guildhall, at one end of which the Watergate, probably opposite the end of the old bridge over the river, still exists in name; and in the Side and the Sandhill are still a number of old timber house fronts, with overhanging stories and ranges of windows of the whole length of the front. Most of these have an unusual appearance, from the fact that the ends of the floor timbers show instead of being cased, and, although they are great baulks of from 9 in. to 12 in. square, are set close together, and look like a row of very solid corbels. The projection of the stories is much slighter, too, than is often the case, and the long window frames being only separated by a pilaster here and there, the wall is largely composed of glass. It is not so picturesque or pleasing an arrangement as one often sees, but the long horizontal lines give considerable breadth, and the large amount of light was no doubt as much a desideratum in offices when they were built as it is at present. The picturesque Jacobean Exchange and Guildhall shown in old engravings have been cased with plain stonework; the tower has been taken down, and a one-story annexe built against the Guildhall arcade. The exterior has now no more interest than can be found in a very simple Greek Ionic portico of three quarter columns; but the upper floor inside remains much as it was. The Guildhall is a long, rather low room, with a Jacobean hammer-beam roof and a curious little clearstory gallery of small arches ornamented with

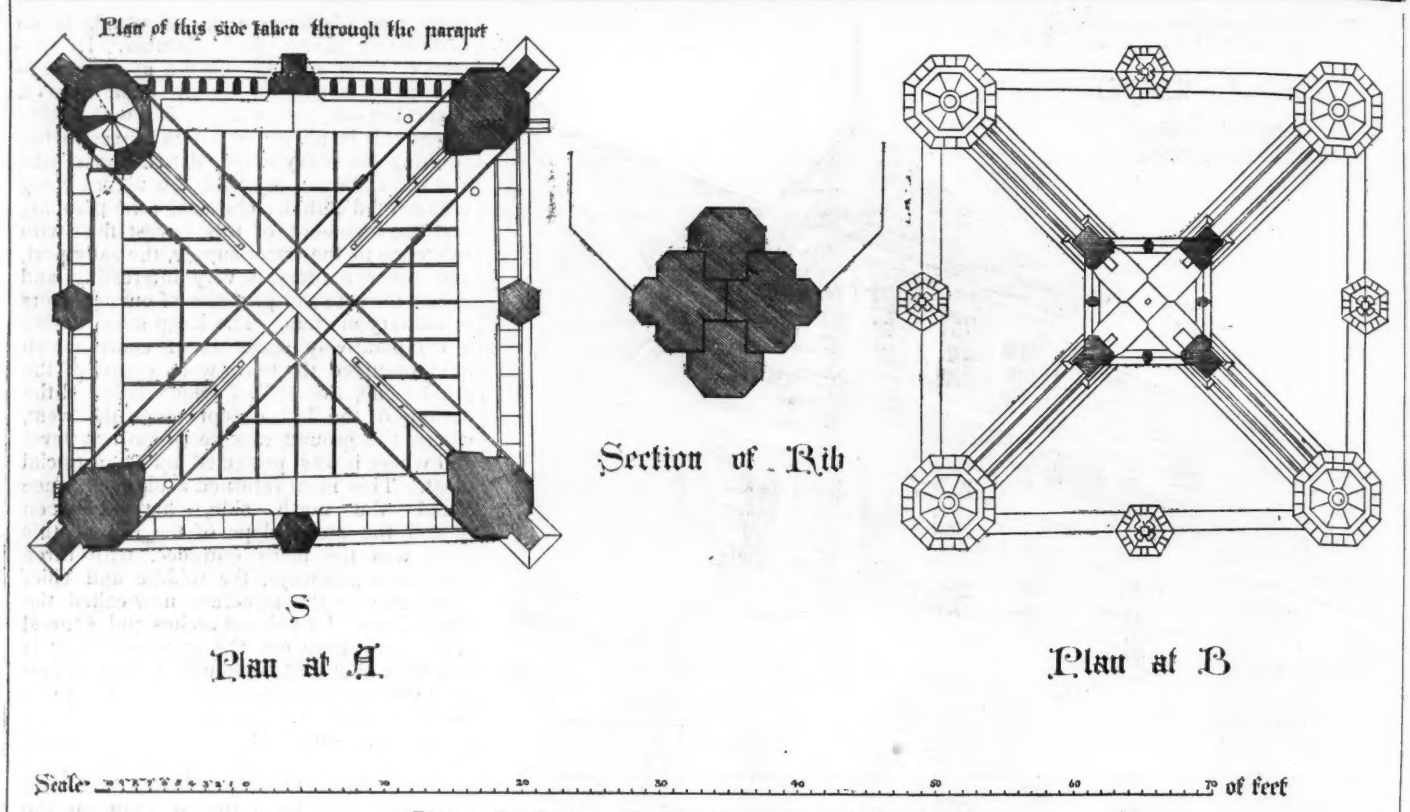

Fig. 3.—St. Nicholas Church: plans of two stages of lantern.

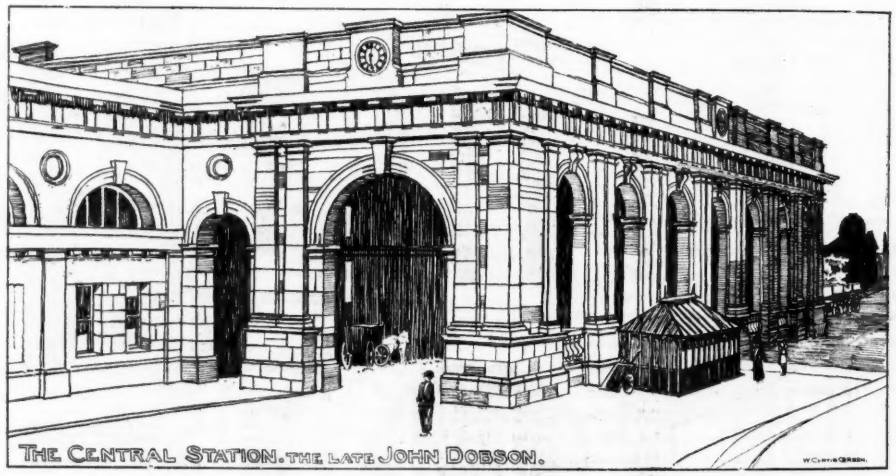

Fig. 4.

baby rustications and a heavy and rather grotesque balustrade; altogether a quaint and interesting interior. At one end of it there is a large square room, called the Merchants' Court, with a very rich, heavy, plaster ceiling, a quaint carved wooden chimney-piece, of similar date, and high, delicately-moulded oak panelling, with a very richly and deeply carved frieze and cornice. The Mayor's room, a long, low apartment beside the Guildhall, is also very interesting, with its lighter modelled ceiling and panelled walls, on which are painted views of the town as it may have been 250 years ago.

The west side of the Sandhill has been almost entirely rebuilt. There are in it six new lofty stone fronts, all of more or less merit, from the Royal Insurance Company's block at the top, by the late Mr. Parnell, which has the dignity of large scale, though some of the details are questionable, to the picturesque gables of the two narrow buildings at the other end. The most refined and pleasing of the six is the front next to the Royal Insurance; its only fault being a slight hardness in some of the carved work. Carved ornament is, however, a frequent source of failure in modern architecture, even where the rest of a design is excellent. It is to be feared that many architects leave it entirely to the carver, and that few architectural carvers are enough of artists to be so trusted. The foliage panels on the building at the south end of this row are an example of the commonest kind of fault, a lack of the emphasis of line or of contour that would give some little interest. These panels, even at quite a short distance, show only a quantity of small, neatly finished work, all of one depth and size, that would make an excellent background for ornament, but is not really ornamental in itself. In the Side there are no modern buildings of much interest, but the very neat little "Crown" licensed premises, which faces the florid, heavy Gothic front of the Tyne Printing Works, is worthy of notice. At the top of Dean-street, which is also without architectural pretensions, there is Mr. Waterhouse's red stone and brick Prudential Assurance buildings; a large block, which is a strange mixture of Gothic feeling and rather heavy corbel tables, with refined classic details. There is much skill shown in proportioning the stories and drawing together the upper windows, and especially in the way in which the first and second floors are brought together; but we think a much heavier cornice over the ground floor windows is wanted. The refined and dignified National Provincial Bank, opposite, a design of the late John Gibson's, is the only building which we remember to have seen in which the introduction of polished red granite shafts seemed to be an improvement, by giving a touch of life without destroying the repose of the composition. The grilles in the heads of the ground-floor windows are a graceful detail, in keeping with the architecture and purpose of the building. "Mosley Chambers," next door, is a clever piece of more recent design, very carefully detailed; but there is rather too much striving for effect in it, and it wants a heavier cornice and deeper architrave to the order. The block at the corner by the old church is a fair example of Renaissance of the old-fashioned sort, with an effective crowning cornice. The little new front of the Royal Exchange Assurance, near the east end of Mosley-street, is also worthy of note.

Grey-street, the continuation of Dean-street, affords a probably unique example of a grand architectural effect resulting from the labours of the much-abused speculative builder. Its series of handsome stone buildings owe their existence to the successful carrying out of the gigantic schemes of Richard Grainger, a speculator of the second quarter of this century, whose broad views included the employment of the best available architectural talent, thereby placing Newcastle architecture on the high level it has since on the whole well maintained. Grey-street is laid out on a curved line, and rises rather rapidly, circumstances which probably save it from the too great monotony that would otherwise have resulted from the very long frontages and similarity in design of the blocks. It was a mistake, however, under the circumstances, to design long frontages at all, for architecture of the strict classic type then in vogue does not admit of breaks in the levels without losing its unity, and the steep rise necessitates many such breaks, producing the effect of a number of separate buildings that seem as if they might just as well have had the added interest of a little more variety. The first block on the west side of the street consists of seven sections, alternately plain and ornamented with a large order of three-quarter Corinthian columns, the longest of the latter being occupied by the Bank of England (see lithograph). Opposite to this, above the rather weak little Scottish Widows' Fund premises, is a similar block with the same order in a middle section, flanked by coupled pavilions with corresponding pilasters on the angles, and, beyond them, long plain wings terminating in pavilions similar to the others but with Greek antæ

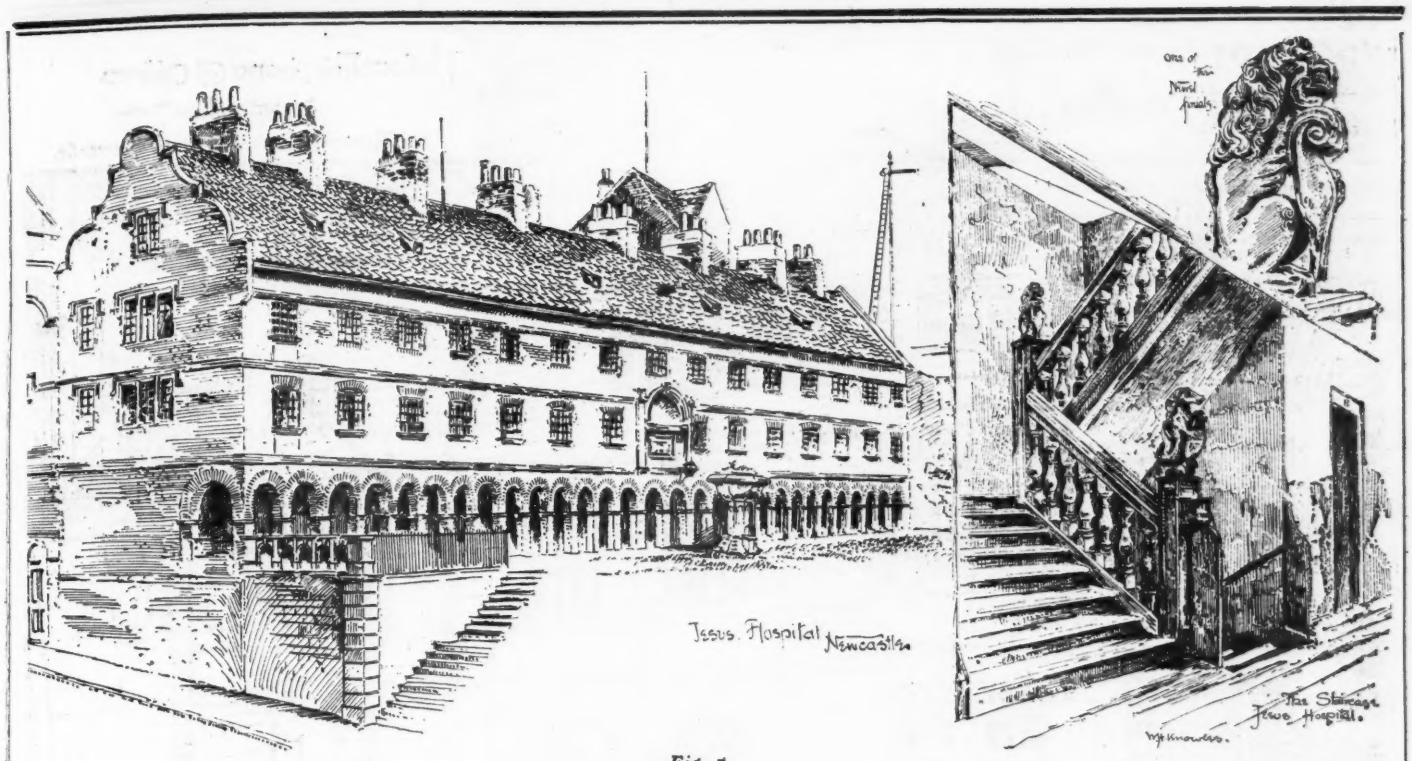

Fig. 5.

caps to the pilasters. There is a very charming little new stone shop front to Messrs. Pullar's premises in the first-named block. The upper part of the street is broken up into rather shorter frontages, especially on the east side, on which are situated the Theatre Royal and Lambton's Bank (see lithograph), while on the other side are the Royal Exchange Buildings, which have circular pavilions at the angles surmounted by domes. All these structures, including, of course, their return fronts in Shakespeare-street, Market-street, and Hood-street were erected by Grainger and designed by one of the four architects he employed—Benjamin Green, John Dobson, John Wardle, and John Walker; most of them by the first named. They are all, though varied in grouping and details, of similar character, four stories high, the lowest consisting of shop fronts and the top one an attic, with an order between, running through two stories. The theatre alone has, on its main front, an order of the whole height of the building and a pedimented portico extending over the pavement. They are not calculated as designs to satisfy any craving for originality or the picturesque, but neither are they paltry, strained, or fussy. They are the learned and self-restrained product of a time when learning and self-restraint were held in more esteem than originality; and if they do not greatly interest us, we cannot but admit their excellent qualities, and they are certainly effective in the mass. At the top of Grey-street, at its junction with Grainger-street, is the great Doric column surmounted by a statue of Earl Grey, which was erected to commemorate the passing of the Reform Act of 1832. The absurdity of such monuments is so obvious, and now so generally acknowledged, that one need not insist on it; but it is only fair to say that the position chosen for so striking an object, on the summit of the hill, facing down two long main streets, makes it an important ornament of the town that could ill be spared. All the upper part of Grainger-street is similar in its main features to Grey-street, having been also built by the man from whom it takes its name; but there is a new stone front to the ground story of the London and Midland Bank, opposite the end of Market-street, that is well worthy of notice. Nuns-street also evidently dates from Grainger's time, and shows how passable an effect may be obtained by merely a few well proportioned breaks and a good cornice.

The Bigg Market is chiefly surrounded by old brick buildings, and among the modern and, some of them, ambitious stone fronts the only one that calls for notice is "Central Buildings," a broad gabled wall containing two large two-storied oriels, above which there is a long range of windows, separated by little columns. The detail is unfortunately not equal to the general arrangement. At the bottom of Bigg Market, between the Cloth Market and Groat Market, is the block containing the Town Hall, corporation offices, corn exchange, &c. The narrow upper end is surmounted by an ill-shaped turret, and looks altogether uninteresting; but on the broader front in Mosley-street the same rather common-place features (without the turret) have a far from bad effect, a result that seems almost entirely due to the greater breadth. The front of the Collingwood Restaurant in the Groat Market is designed in a style that seems to be a modern variation of the Elizabethan, and would be very charming if the upper part were as good as the ground story, and if the windows had stone mullions instead of thin wooden ones. Opposite to the Mosley-street front of the Town Hall is the old church of St. Nicholas, now the Cathedral, with its well-known tower surmounted by a sort of crown formed of four flying buttresses that rise from inside the lofty angle pinacles to support a central stone lantern (see lithograph and Fig. 3). This crown was erected about the middle of the fifteenth century, and is said to be the original from which the similar ones at Edinburgh and Aberdeen were imitated; the pinacles and parapets of the tower were no doubt re-built at the same time, if not the whole belfry stage. The body of the church, though large, consisting of a long nave and chancel with very broad aisles, transepts, and the rather unusual feature in an English church of a south chapel near the west end, is a very plain specimen of late Middle Gothic, the richest piece of old work being the lierne vault of the lowest stage in the tower. There is also a rich wooden font-cover of very late date and poorly carved, surmounting a plain, purbeck vase-shaped font—ornamented with coats of arms! The modern reredos would have been better higher and rather larger in scale, and the very rich wooden screens and bishop's throne are much better in execution than in design. In the retro-choir is a large picture ascribed to Tintoretto, and a very good modern triptych. There is a very pleasing seventeenth century building in the churchyard, chiefly used as vestries. The narrow corner building occupied by Lockhart's café, opposite the west end of the church, is nicely designed, and the large block by the late Mr. Parnell, called High Level Buildings, though otherwise rather commonplace, acquires a great deal of character from the broad arched bays introduced near the end. Very much finer, and more effective, however, is the old Post Office, built in 1876 by Mr. J. Williams. It is a building of three bays, four stories high, with two large orders superimposed, elements which, combined with coarse detail as they are, would not usually be exceptionally pleasing; the effect seems to be due to the deep recessing of the middle bay of the two lower stories, the reduction of the lower entablature to a minimum, thus giving prominence to the crowning one, the marked treatment of the middle window over the recess, and the strengthening of the angles with heavy rustication; its lesson seems to be that style and detail are second in importance to the way in which they are used. The weak, lifeless, uninteresting, new Post Office buildings in the rear, facing Westgate-road, are a sorry contrast to the old one.

There are two large and very satisfactory buildings in Collingwood-street; Messrs. Hodgkin & Company's Bank on the south side, by the late Mr. R. J. Johnson, especially, is a composition of the highest excellence; extremely simple in its elements, depending solely on the treatment of its doorway and windows and a crowning entablature, it owes its success mainly to good proportion and detail and a judicious distribution of solids, voids, and enrichment, the latter consisting chiefly of rustication and a swag ornament in the frieze. It is not too much to say that, without being too close an imitation of any of them, it is equal in beauty to the best of the Florentine palaces on which it is founded. The Northern Assurance Company's building by the same architect (see lithograph), though not equal to the other, is also pleasing; it has a Roman Ionic pilaster order in the upper part and a good crowning cornice, the pilaster caps are heavy and not very well carved, and the rather poor dormers and one or two other weak details a little spoil it. The Wood Memorial Hall, at the corner of Neville-street, by Mr. Archibald Dunn, is designed in the now abandoned heavy French Gothic style, and is a clever piece of work of its kind, but it is interesting to note some of the difficulties the architect had to contend with in trying to adapt the style to modern requirements; how the window arches had to be filled up to get a square head, and how even then the wide spreading caps of the shafts in the jambs would overlap the window and necessitate a distortion of

Fig. 6.

the frame, and how the wall had to be set back to get something in the shape of the supposed necessary buttresses. As far as adaptability is concerned, there is at least as much to be said for the Greek style of the little Literary and Philosophic Society's building next door. The Station Hotel is not more successful architecturally than most large hotels; but the Union Club, opposite, which was illustrated in the *Builder* some few years ago, is a very pleasing composition; it is a pity that the details of the François I. style, in which it is designed, were not more closely followed; the general handling is so skilful, one regrets the more the lack of refinement here and there. Not much can be said in favour of the statue of George Stephenson, but the quaint little gabled building facing it on the west is interesting; one wonders how the date 1856 comes to be affixed to it; it cannot be a modern design one would think. The front of the Central Railway Station is one of the great ornaments of the town; it was erected by the late John Dobson at the end of the forties in the broad, simple, and scholarly style he was accustomed to, and the long wings and end pavilions are as appropriate and effective as any railway station architecture we remember to have seen (fig. 4).

Close to the railway station, at the corner of Bewick-street, is another very successful, though smaller, building, the offices of the Tyne Improvement Commissioners, erected in 1885. It is a rectangular block of Renaissance character, with a rusticated ground story and a good cornice over the first floor, the three middle windows of which are deeply recessed and circular-headed, while those in the wings are square. It is all good work, but what gives the building character especially is probably the treatment of the attic to the wings, which is ornamented with large shields and coats of arms on the angles and between the windows. Nearly opposite is Pugin's Roman Catholic Cathedral, a long, low, three-aisled church, with the nave and choir under one roof, and not much wider than the aisles. The roofs are of soft wood with arched principals, and look very thin and light; that over the choir is heavily painted and gilded. The detail throughout is of the Decorated period, and very carefully carried out, especially as regards the tracery of the smaller windows, which are all different, and nearly all good; the large east and west windows, the west one particularly, are poorer, and the stained glass, with which all are filled, is nearly all very bad. The stone rood screen with its marble shafts, though rather thin, is as nice as anything in the building, and is, we take it, part of the original work. The tower and spire, which are later additions, are ill-proportioned and badly detailed, which is a great pity. Pugin's work, though far beyond anything else of his time, is not so good but that a little care might have produced a steeple at least worthy of it.

The first noticeable building in the lower part of Grainger-street is St. John's Church, a plain little edifice very similar, on a smaller scale, to St. Nicholas; there are the same plan, the same thin octagonal piers with no caps, the same groined chamber under the tower, and an almost identical font cover. The church is said to date from the reign of Henry III., and there is one early capital in the north transept, but most of the recognisable detail is Perpendicular (except such as is modern). The Savings Bank opposite is a dignified little old-fashioned structure, with a rusticated ground story, and an order of pilasters above, which become Ionic columns in the middle of each face and support a pediment. The gas company's offices, to the north of the church, make a very picturesque block, with their high roofs and François I. dormers and forest of elaborate finials, and the gabled front next to them has a great deal of character; but most of the buildings in this part of the street seem satisfied to depend on their importance and great elaboration; the best, after those already named, is, we think, the first Gothic one; its large crocketed gable does, at any rate, give it some distinction, and its detail is in character. On turning into Newgate-street one cannot quite pass over the new Empire Theatre; poor as it is in the lower part, its stepped gables and flanking turrets are not without merit; neither is the queer little Gothic revival castellated block opposite likely to escape notice. At the top of the street is St. Andrew's church, said to have been built by King David during the Scotch occupation of the town; it has a Norman chancel arch and other traces of early work, but has been so often altered and restored that its history is obscure. A part of the old town wall, including a bastion, forms the north boundary of the churchyard, which possibly accounts for the church having suffered a good deal and required much rebuilding. In the neighbourhood is Eldon-square, another of Richard Grainger's speculations; it is surrounded by very plain three-storied stone houses with slightly-projecting blocks at the corners and a lofty one in the middle of the end; the top story is an attic above a plain block, cornice. The whole quiet, simple, solid composition looks like a bit of old Bath dropped down in Northumberland. It is now on the borders of a rather poor quarter, on one side, and most of the houses have been turned into offices. A little east of the square, on the other side of Blackett-street, there is an interesting little building of about the same period with a recessed centre and Greek detail; and next to it a lofty new block, with mullioned windows and large dormers, that is well detailed and looks as if it would be a success when complete. The little old Presbyterian church opposite is a reasonably good example of revived Gothic, and there are several important new stone

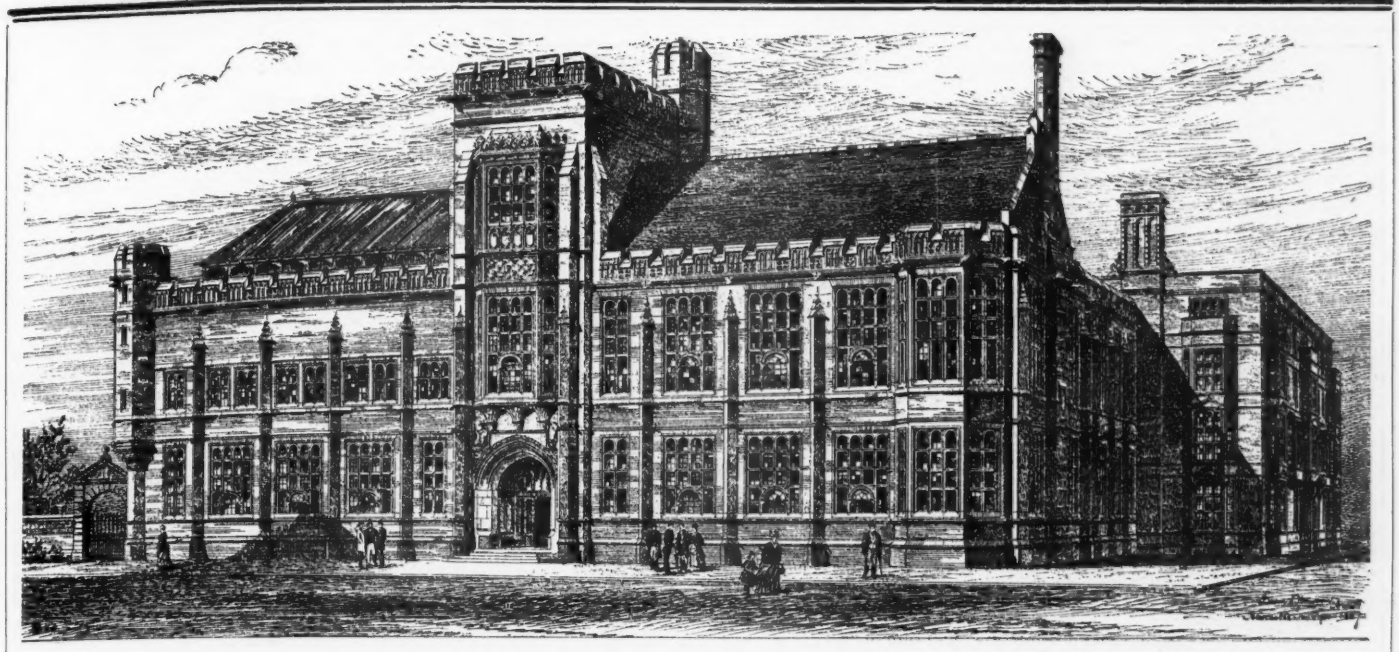

Fig. 7.—Durham University Medical College, Newcastle-on-Tyne. (Messrs. Dunn & Hansom.)

buildings between this point and the top of Pilgrim-street, but most of Blackett-street is taken up with very plain brick fronts.

The Central Police-courts in Pilgrim-street is a florid, and not too successful, composition in a sort of Venetian Renaissance manner, with a large octagonal lantern. St. Andrew's Roman Catholic church behind them in Worsfold-street, is a modern Gothic structure of good Decorated detail, with one narrow aisle and a short apsidal sanctuary. Close to this is the gaol, which has a boldly and originally designed entrance gateway, with battered walls and a huge roll and cavetto cornice, rather resembling a pair of Egyptian pylons, but much spoilt by one side being pierced with windows. Nearly opposite the police-courts is the New Masonic Hall, by Mr. John Johnson: as a composition it has rather too much in it, and, although it probably looked fairly well on paper, it appears thin in execution, owing to the very slight projection of the parts. The new offices of the Water Company, and particularly the business block next to it, are excellent examples of recent Renaissance work; the former has a large Corinthian pilaster order in the upper part, with a deep ornamented frieze and good cornice; the front is pleasantly broken by little stone balconies to the second floor windows, and the dormers are cleverly treated, but the doorway is rather weak and the rusticated ground story is too thin and small in scale for the large order above. The building next door, by Mr. F. W. Rich (see lithograph), suffers even more than usual in appearance from the glass shop fronts on which the wall stands; perhaps because the upper part is so solid and good. There is no order, but the necessary windows are made the most of, being carefully proportioned and treated according to their importance, from the rich architraves and rustications of the first floor to the plain squares and circles of the top ones, a good and very original cornice surmounting the whole. Nearly opposite is a rather interesting old brick building with small projecting wings, formerly the "Queen's Head Inn" and now occupied by the Liberal Club. The Royal Arcade, facing the end of Mosley-street, another of Grainger's works, is a building of Greek detail with a Doric order to the ground story, and a Corinthian one running through the first and second, which has very beautiful caps to the the columns; the upper floors are recessed between small wings and have a fine frieze and modillion cornice of unusual design, above which is a plain attic story and high balustrade—the latter very much out of keeping with the Greek details.

Near the east end of the Arcade, and now partly buried by the viaduct carrying the City-road, is a block of seventeenth century almshouses, called the Holy Jesus Hospital (fig. 5), a three-story brick building with quaint end gables, very small windows, and a ground story set back behind an arcade of small arches formed of curious round-edged bricks: there is a very large stone fountain in front of the centre, opposite to the old wooden staircase which has a solid characteristic balustrade. The little hospital for sick children facing the almshouses is a new building of good design, but faced with red pressed bricks with black joints that give it a hard appearance. The National Telephone offices in the lower part of Pilgrim-street (fig. 6), a new red stone structure by Messrs. Armstrong & Knowles, is carefully designed, and has some interesting features, among which the double-arched entrance is the best; the lights of the principal windows are rather too wide, and suffer from being filled with large undivided sheets of glass. There are a number of old brick buildings of the late seventeenth and eighteenth century in the neighbourhood, notably a large one exactly opposite, which has a wide projecting and beautifully carved wooden cornice. At the bottom of the street, on a spur of hill, in the midst of a low-lying and squalid quarter of the town, is All Saints' Church (see lithograph), a building which has several times been illustrated; it has a curious elliptical shaped nave and no chancel. It was erected in 1789 on the site of an older church which tradition asserts had succeeded a Roman pantheon. The plan is really almost circular, and with the two semicircular recesses is not unlike a Roman one; probably the tradition put it into the head of the architect to adopt so unusual a form. The tower rises to a considerable height, a circular vestibule being formed in its base and a characteristic Wren-like spire erected upon it. The detail generally is delicate and resembles the work of Adam and Wood, and it need hardly be said that the spacious interior has a rather impressive effect.

Between the shabby neighbourhood round the church and the quays are Queen-street, King-street, and Lombard-street, bordered by lofty new stone commercial buildings of imposing appearance, but mostly suffering, like similar buildings elsewhere, from the difficulty most architects find in grappling with the demand for a maximum of window, a difficulty that seems generally met by an ill-judged effort to make the most of the remaining wall space by cutting it up as much as possible. The buildings in these streets are above the average of such work, but there is none that one can pick out as quite successful except the Tyne Steam Shipping Company's offices, by the late Mr. R. J. Johnson, a composition with a small pilaster order to each story, carefully spaced mullioned windows and large dormers, that is entirely charming. The Custom House on the quays has a satisfactory little well-proportioned Classic front, but is of no great importance; between it and the Broad Chare —chare being the Newcastle equivalent for alley—is the old Trinity House, surrounded by a maze of almshouses, mostly built about the end of the eighteenth century. The entrance is used as a kind of museum, and in the Board-room and Hall, which has some good oak panelling, are a number of pictures mostly connected with naval matters, and several of them very good. The interesting fifteenth-century chapel is fitted up with Elizabethan woodwork, and its ceiling is intended to represent the underside of a ship's deck, presumably that the pensioners might feel themselves at home. There are a number of eighteenth-century brick houses about this neighbourhood, some with moulded brick and stone work about them, one, in Broad Chare, with elliptical window arches, but most are in an advanced state of dilapidation, and given over to a very poor class of inhabitants. The old Keelmen's Hospital, dated 1701, in the City-road, is hardly more presentable; one of its curious dormer gables is gone, the central turret with its sundial is stuccoed over, and the front is provided with wooden eaves, gutters, and down-spouts. It stands next to an enormous modern Board school with crows'-foot gables, which, though it could never be very ornamental, might have been greatly improved if the turret had received more careful consideration. Passing from this point towards Trafalgar-street, one passes near St. Cuthbert's Church, a new red-brick edifice of good lancet style by Mr. A. Gibson, with a tall tower surmounted by a short square spire, and a circular apse. In the choir is some very good stall-work and colour decoration, and an excellently-designed reredos by Messrs. Hicks & Charlwood.

Trafalgar-street lies close to the line of the old town wall, and just before coming to Melbourne-street, and at the corner of Carlisle-street one sees two of the bastions which have been retained, with the rather interesting little classic structures that surmount them, one of which seems to be used as a dissenting chapel. St. Peter's Church, in Oxford-street, built in 1843, is an excellent example for its date of a modern Decorated Gothic church and has a very well-proportioned tower and spire. The Public Library, in Bridge-street, is a very ornate stone building with a long front in Modern Renaissance style, with a projecting portico and a raised

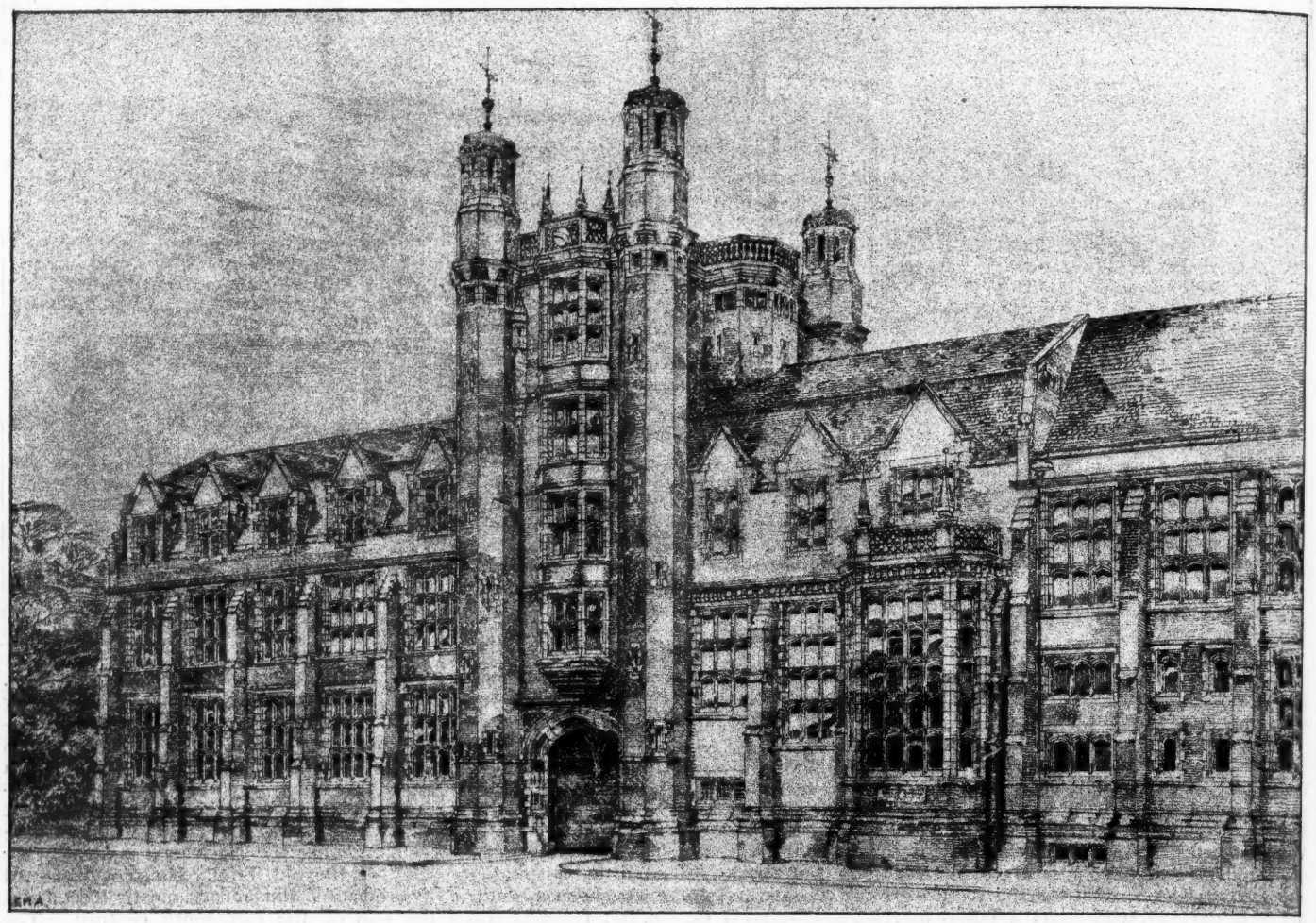

Fig. 8.—Durham College of Science. (The late R. J. Johnson and Mr. F. W. Rich.)

centre consisting of a caryatide order supporting a pediment. The projecting wings, one of which is occupied by the Mechanics' Institute, do not correspond; and the whole design, though it has the dignity given by a good deal of blank wall space, is but a moderately successful piece of architecture. A little west of the Library, on the same side, there is a new business building which has some effectively designed dormers. In Northumberland-street a wall-paper maker has planted rather wildly designed, but not ineffective, wooden features on the old brick front of his premises; and Messrs. Armstrong & Knowles have no doubt done all they could to make the best of Messrs. Coates & Sons' premises—the lower part of which is all plate glass—by the use of excellent detail and putting only a row of quiet but well-designed gables to the upper part. The pilasters on the new stone front, two houses further on, are sadly spoiled for want of a little entasis. There is a group of very good buildings at the end of Northumberland-road, of which the most important is the Medical College (fig. 7), a red brick building with stone and terra-cotta dressings by Messrs. Dunn & Hansom; it is of Late Gothic design with crenellated parapets, mullioned windows, and a lofty central tower over the entrance, in the manner of the Oxford and Cambridge colleges, and is well carried out. Opposite to it is a school and master's house in Queen Anne style, which it is difficult to believe is not old work. They are built of thin bricks with stone quoins, and have wooden bays and oriels, and a heavy wooden cornice. The entrance is flanked by two little square towers with ogee roofs; the detail throughout is remarkably good, and the character preserved without a flaw. The Congregational church which stands next to the school has a large octagonal central lantern and spire, and, though rather thin and weak looking, is reasonably well detailed and a very fine piece of grouping. The Presbyterian church, opposite, is also very good, with the exception of the belfry stage of the tower, which wants boldness. Messrs. Brady & Martin's premises, and the Pitman's Institute, in the same group are both, also, worthy of notice.

The Durham College of Science (fig. 8) in the north of the town, near the Leazes, is a very large block of building in red brick and stone, with mullioned windows of late character and Elizabethan detail, by Messrs. R. J. Johnson and F. W. Rich. It has a lofty tower over the main entrance, flanked by very prettily finished octagonal turrets, and, though comparatively plain, it would be exceedingly effective but for the undivided glass in the windows, which much injures its character. The Hancock Natural History Museum, in the same neighbourhood, is a dignified, but plain, old-fashioned edifice with an order of square piers and a plain cornice and high blocking course.

At the commencement of the Westgate-road there are several old classic buildings, including the County Court and old Assembly Rooms, and especially a building opposite the County Court, that are worthy of notice; and just beyond Clayton-street, are two new stone commercial buildings with Ionic pilaster orders, the first of which, we believe, is by Messrs. Armstrong and Knowles (see lithograph); and a very good piece of work; a little spoiled, perhaps, by its staring, polished red granite ground story, and by some rather weak carving, but with good architectural detail and pleasant proportions; the little round turret that surmounts the rounded corner is an especially charming incident. The Co-operative Printing Society's building, by Mr. Rich (see lithograph), and Rutherford College in Bath-lane, are also noticeable; the latter, though very plain generally, has some original treatment and good late Gothic character in its front. Close by Bath-lane another section of the old wall is to be seen. Beyond this there is nothing in Westgate-road of architectural interest until St. Matthew's Church is reached. This is a late Decorated Gothic building of exceptional excellence, by the late Mr. R. J. Johnson (see lithograph), the tower being particularly good, especially the belfry stage and the graceful angle turrets surmounting it; all the detail, even where some originality is shown, is in character and carefully designed and executed. St. Mary's, Rye Hill, an older Gothic church, by the late Benjamin Green, is a cruciform Decorated Gothic edifice, with a well-proportioned tower and spire at the crossing, and is fairly well detailed for the period when it was built, though hardly interesting now. All around, and west of this church, the neighbourhood is residential, mostly consisting of small brick houses, not architecturally interesting, but pleasantly situated in wide streets and among well-kept gardens. The places of worship of various denominations are numerous, but it will suffice to mention the new Congregational Church at the corner of Elswick Park,* an early Gothic composition of much better design and detail than most, and Messrs. Dunn & Hansom's lofty and original Roman Catholic Church of St. Michael, a cruciform building of Flowing Decorated style with a large stone octagonal lantern at the crossing (see lithograph), the detail of which is learned and the vertical character very impressive. We give illustrations of three of the Board Schools; the Royal Jubilee Board School (fig. 9), by Messrs. Dunn, Hansom, & Fenwicke; the Ouseburn Schools, by Mr. Rich, and the Sandyford-road School, by Messrs. Armstrong & Knowles (see lithographs). Among other buildings illustrated which we have not had space to describe specially are the two large blocks of building by Messrs. Oliver & Leeson; the Home for Incurables, by Mr. Shewbrooks, and two street fronts by the same architect; one of which, Guildhall-chambers, is an exceedingly pleasing and refined elevation.

There is so much of architectural interest in Newcastle that it is not possible to notice every building, especially in the outskirts,

* See the *Builder* of the 24th ult.

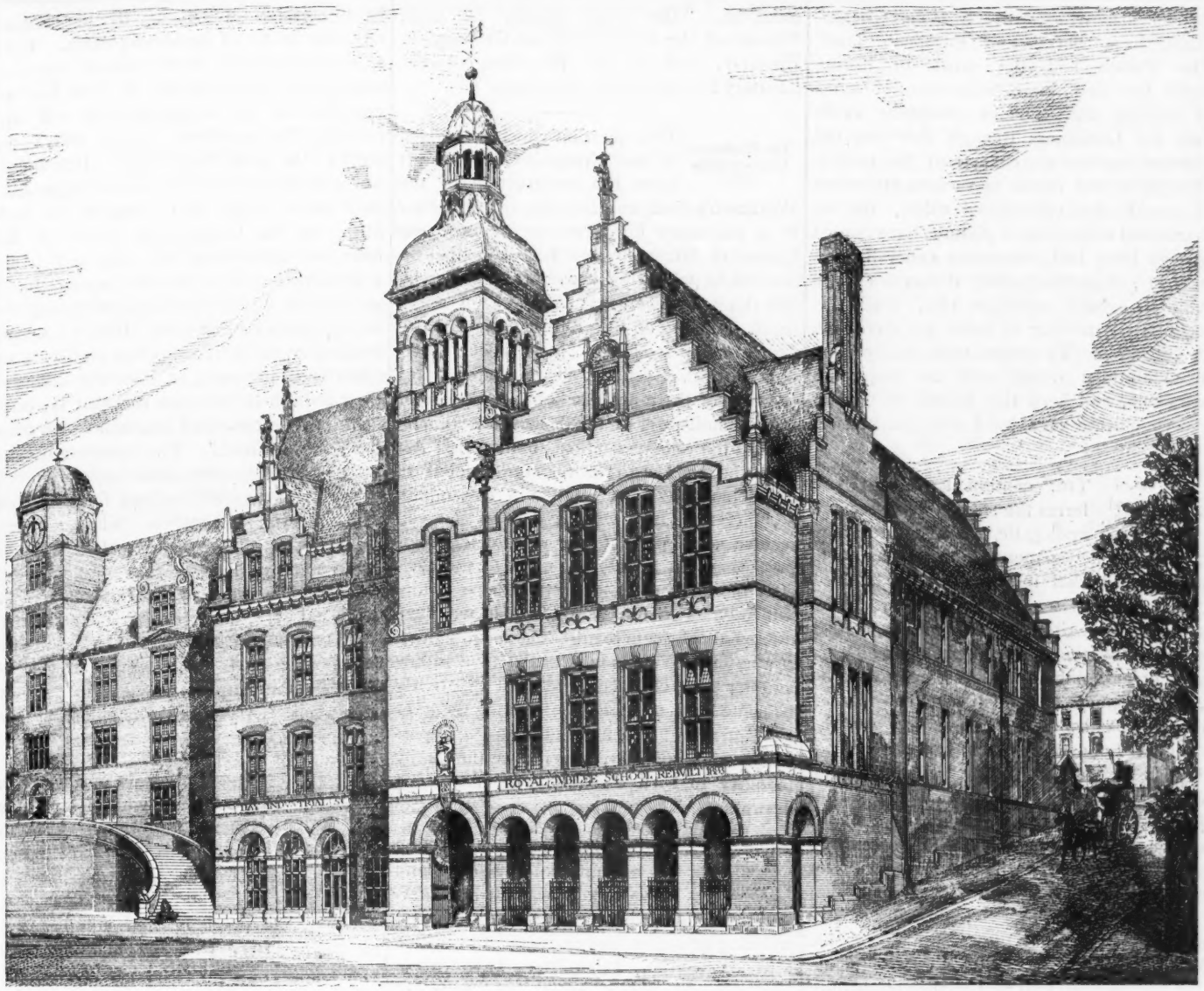

Fig. 9.—Royal Jubilee Board School. (Messrs. Dunn, Hansom & Fenwicke.)

that is worthy of criticism. Public, commercial, and ecclesiastical architecture are all on a high level; in domestic work alone there is a failure. Neither in Jesmond nor the Elswick quarter do we find any examples of houses or villas of more than low average merit as architecture; in this direction Newcastle architects must look to their laurels; a community that could produce and appreciate the late Mr. R. J. Johnson should be able, without much difficulty, to find a good domestic architect; and when he is found, let him be well supported, that Newcastle architecture may hold its own in all departments.

NOTES.

The "Peitho" of the Parthenon.

In the last issue of the "Bulletin de Corr. Hellénique" (XII., 1898, August, p. v.) M. Edmond Pottier publishes an archaic terra-cotta found in the excavations on the Acropolis at Athens, which is of considerable interest in relation to a group of seated divinities in the east frieze of the Parthenon. The terra-cotta plaque in question is one of six replicas all representing the same subject, *i.e.*, a woman seated on a *diphros*, or stool with room for two persons, her feet resting on a footstool. The design is worked in very low relief, and is in the style of the late sixth or very early fifth century B.C. The plaque is pierced with a hole for suspension, and was evidently an *ex-voto*. Its interest consists in its close analogy to the figure usually known as Peitho in the Parthenon frieze, a figure seated next, it will be remembered, to the undoubted Aphrodite. It has been urged that Peitho (Persuasion) is too feeble and allegorical a personality to claim a place among this assembly of august Olympians. M. Pottier points out that she was from very early days the object, conjointly with Aphrodite, of a definite cultus, a cultus imported according to Pausanias by Theseus. Her sanctuary stood immediately in front of the Propylæa. The terra-cotta he believes to be one of the many *ex-votos* suspended there.

*** This series of illustrated articles was begun in our issue of September 26, 1896. A list of those towns already dealt with, and particulars of future arrangements, will be found in our advertisement pages of last week.

Discoveries at Delphi.

The same number of the "Bulletin" contains the first published account of the interesting bas-reliefs discovered in the theatre at Delphi. These bas-reliefs are sculptured in long plaques, each of which is carefully numbered or rather lettered; they must obviously have decorated the proscenium in similar fashion to the Dionysiac reliefs at the Athenian theatre. The style is late, the execution somewhat coarse; on the whole it seems likely that the reliefs were executed in the second or at latest the first century B.C., the subjects represented are the Labours of Hercules, a subject not at first sight specially appropriate to a theatre of Dionysos. It is known, however, from an inscription, that Eumenes of Pergamos gave in 159 B.C. a large sum of money to be employed in part in the restoration and embellishment of the theatre. Pergamos boasted descent from Heracles, through Ange and Telephos. The Delphians had a feast, "Eumeneia," in the month Heracleios, and it seems highly probable that they decorated their theatre with a subject complimentary to the donor. Such is the opinion of M. Perdrizel, who publishes the account.

New Crystal Palace Company.

The prospectus of a new Crystal Palace Company, with a capital of considerably over half a million, is to be issued in the course of the present month. The Crystal Palace has been such a valuable institution in connection with public recreation, not unmixed with instruction, that its continued existence is a subject of almost national interest, and it is to be hoped that with the new company it will enter on a new and prosperous career. If there is capital to lay out in the first instance, there is room for a great deal of initial improvement in staircases, approaches, sanitation, and putting the whole vast structure in a state of thorough repair. Among the many improvements of various kinds which might be made in the arrangement of attractions of the Palace, we would suggest that, in connexion with the more serious and intellectual class of recreations, the new company should endeavour to bring its exhibits of works of art up to a higher mark. In the art of music the Crystal Palace occupies an important position; its Satur-

day concerts, which arose from small beginnings, have become of European fame. The Palace had the credit of having made the first large collection of casts of antique and modern sculpture available for Londoners (though they are not grouped together as a collection); the models of architectural courts of various styles are of considerable educational value. But its occasional collections of pictures have almost always been bad, consisting generally, one may say, of pictures which it was not worth while to exhibit anywhere else. Such collections are neither of value for recreation or education. To secure some really good art-exhibitions would add an important attraction, and keep this branch of Crystal Palace culture on a level with its musical reputation.

Drought and Water Supply.

THE continued drought still forms the subject of vehement, apologetic, and scientific letters in the daily newspapers. The question as to what is and what is not a "water famine" especially exercises much ingenuity on the part of the writers. One remarks, rather sarcastically, that Nottingham and Leicester are not suffering from any scarcity with 19 and 20 gallons per day per head—in fact, that those cities have "abundance"—whilst in East London 25 gallons per head per day is a "water famine." Mr. Chaplin, who ought to know better, acted the part of Job's Comforter last Saturday, in a public speech reminding people that there are many parts of the country which are worse off for water than the East End—as though that could make amends for the recurring failure of the supply in that part of the metropolis. Not to be beaten, a Berkshire writer explains that he has been told that on the Oxfordshire hills people are paying for water by the pailful. Many of these writers seem to forget the one important point, so far, at least, as London is concerned. People here are called upon to pay a very heavy rate for what they do not get. They have practically no redress, as the control of the supply is not in their own hands. It has been conclusively proved that plenty of water is obtainable by those who fail to supply it, if they will only go to the expense of getting it. Instead of doing that, a patchwork compromise is suggested, which Londoners do not like, and Bills bolstering up the patchwork are, therefore, blocked. Stubborn as ever, the suppliers wait events. The inevitable comes, and the people are reminded (in a way) that the failure is their own fault. It is simply absurd to suggest that there is not enough water in England for its inhabitants—as some have maintained. The fact is that, in spite of the assertion that Nottingham and Leicester find 19 to 20 gallons per head per day "abundance," people want more and more water every year. The demands of sanitation compel this, and the natural instincts and requirements of the average citizen are in its favour. The quantity per head demanded by the Duke of Richmond's Commission—so fondly quoted by the up-to-date "authority"—must be reconsidered. The prophets have not been missing during the drought, and they have written letters enough; would they have written so much had their predictions not been fulfilled? Finally, we have the Mayor of Lyme Regis, who informs us that what Sir J. Fayrer told the Sanitary Institute at Birmingham especting the water supply to his village is incorrect. "Our water supply," he says, "is one of the very best, if not the best," in England; and so the President of the Sanitary Institute is set at nought.

The Workmen's Compensation Act.

THE question which has arisen in the Liverpool County Court upon the construction of the Workmen's Compensation Act, as to whether it is necessary for a widow to take out Letters of Administration before compensation can be paid to her, is one of great interest. We think, however, that there is not really much difficulty on the point, and the County Court judge seems to have been rather hypercritical. Section 5 clearly contemplates the case of there neither being an executor nor administrator of the deceased workman. Then the compensation under the Act is to be paid "to or for the benefit of his dependants." A wife is a dependant, so, therefore, is a widow, and so she can receive some part, at any rate, of the compensation. It is only in regard to the division of the compensation that there is any difficulty. For the words which we have quoted above seem to introduce an ambiguity. If a hundred pounds is awarded to a widow and her three children there must apparently be some kind of agreement among them, or else an arbitration, unless the judge, apparently extra-judicially, can induce the family to agree to such division as he may think desirable.

Tests of Fire-resisting Materials.

WE are informed that "owing to the unreliability of many private and so-called exhibition tests of inventors or traders in fire-resisting materials and systems," the British Fire Prevention Committee have made arrangements for a series of tests of an entirely independent character. A suitable testing station has been obtained near Regent's Park, within easy reach of the West End, and the necessary arrangements are already being made to inaugurate the first series of tests. Systematic research work in the question of fire resistance has as yet only been commenced in the States, and the testing station in question will be the first of its kind in Europe. The preliminary arrangements have been in the hands of Mr. Edwin O. Sachs, acting for the Executive, and Mr. Frederic R. Farrow, acting for the Commercial section. The tests in each case will be undertaken by the Executive in conjunction with representatives of the Council and the general body of members, and the reports will take the form of statements of facts, supplemented by diagrams and photographs, duly attested. If this proposal is adequately carried out in a scientific manner, as we have reason to think it will be, the results ought to be of great value to architects.

Manchester Electric Wiring Rules.

THE revised regulations issued by the electricity department of the Manchester Corporation are worthy of the serious attention of all interested in electric lighting. The rules have evidently been most carefully prepared, and the originality displayed reflects great credit on Mr. Wordingham, the head engineer. They contain, however, an innovation in electric lighting practice, the working of which will be watched carefully by other corporations. According to the rules, no switch, fuse, fitting, or other apparatus must be used by a consumer which has not been certified in writing by the station engineer to be of approved pattern. Consumers, therefore, must submit any new fitting they may desire to use for the approval of the engineer, and "if approved, the certificate issued will apply only to the individual article." If manufacturers wish to have their wares "approved" they must send two samples of each fitting to the Corporation works. If the tests are satisfactory the engineer issues a certificate which gives the manufacturers permission to supply fittings of exactly the same pattern for one year. If they succumb to the temptation of using this certificate for advertising purposes, or alter the design of their fittings, then we are told that the certificate will be cancelled and their wares cease to be "approved." The samples become the absolute property of the corporation, and if approved they will be kept for inspection at the electric light station. The testing and arranging of all the samples that will now come pouring into the Corporation works will entail a great deal of labour on the electrical staff, and if they intend testing glow lamps a great increase in the staff will be necessary. It will be interesting to see whether the corporation will be able to stamp out "jerry" wiring by enforcing these novel rules.

Workshops for Injured Workmen.

THE Municipal Council of Paris is occupied with an important scheme for organising, in the suburbs of the city, a series of special ateliers where working-men who have sustained injuries in the course of their work, which would preclude their entering again on the ordinary work on buildings or in manufactories, may find employment in which they could turn to advantage their special training as artisans. The scheme is still in an initial stage, but if successful it will no doubt be a very beneficial project, and may have imitators elsewhere.

Memorial to Keats at Shanklin.

IT is proposed to erect a memorial to Keats in the Church of St. Saviour on the Cliff at Shanklin, and the Town Council will give the name of "Keats' Green" to that part of the promenade on the cliff which extends to the "look-out." In 1819 Keats quitted "Lawn Bank," Hampstead, to join Rice at Shanklin, where, in a cottage (since demolished) near the Cliff Green, he set to work, in July, with Charles Armitage Brown, on the tragedy of "Otho the Great," and began his own "Lamia."

Wesleyan Centenary Hall, Bishopsgate-street.

WE learn that the Trustees of the Wesleyan Centenary Hall and Mission House, Bishopsgate-street Within, have finally decided to retain the present site for their new buildings to be erected at an estimated expenditure of 70,000*l*. It is proposed to let the ground floor as commercial offices, and to use the rest of the new buildings for the purposes of their home and foreign missions and various other departments. The existing hall was erected in 1838-9 to commemorate the first centenary of the Wesleyan Methodists; in 1842 was built the Missionary Society's House as a depôt for missionaries' foreign outfits. The premises have a frontage of about 66 ft. and a depth of about 125 ft., covering 8,200 ft. superficial, the classical façade rises to a

height of 80 ft. Eleven years ago the trustees entered into negotiations—but the project was ultimately relinquished — for taking a site on the Victoria Embankment, and offered their Bishopsgate-street property, which is freehold, for public sale, having already refused, it is said, 200,000*l.* for it. At the auction on May 11, 1887, at the Mart, the property was bought in at 135,000*l.*, the highest bidding being for 119,100*l.*

Abbey Mansions.

We have received a demand from the legal representative of the architect and the contractor concerned in this building, that we should withdraw the remarks in our issue of September 24 (page 264), as being not warranted by the facts of the case. Two statements, viz.: that the buildings were about to be pulled down, and that the foundations were giving way, appear on inquiry to be incorrect, and we regret having circulated them; but they did not originate with us; both statements were made in more than one daily paper, by which we were misled. As far as regards the contractor, we have never imputed any special blame to him; on the contrary, in our article of May 28 commenting on the evidence at the Coroner's Court (which was referred to in our Note of September 24) we said that though it seemed probable that some bad material had got into the building, there was no evidence to show that this was the case to such an extent as to cause its failure. Apart from these points, we have nothing to withdraw. The evidence in the recent case before the magistrate showed that the Surveyor of the Office of Works stated that the building "was unfit for occupation from a substantial point of view"; the District Surveyor stated that "for the safety of the public the building must be shored up," and that "he was afraid that the part of the turret between the second and third floors would give way and let the whole down"; and it is admitted that this turret (in a perfectly new building) has had to be tied round, at the requirement of the District Surveyor, with a series of steel bands over a great part of its height. Such results imply a carelessness in designing and erecting a building which is not only most reprehensible in itself, but which constitutes a grave public danger, and it is no more than our duty to speak plainly on the subject. As things now stand, the architectural arbitrator appointed at the direction of the magistrate has given orders for the work he thinks necessary for the security of the turret, and we presume it will be made safe.

EAST HAM PUBLIC BUILDINGS COMPETITION.

This competition has produced eleven sets of designs which were exhibited in the East Ham Public Hall on Monday last. Unfortunately, the conditions governing the competitors were not to be had. The scheme is a large one, comprising a Public Hall, Council Chamber, Municipal Offices, Court House, Reading and Reference Library, Librarian's house, Technical School, Swimming Bath, Sanitary Offices, and Fire Station.

The first premium has been awarded to Messrs. Cheers & Smith, of Twickenham and Blackburn. Their plan is to divide the requirements into three separate buildings and place the Librarian's house in the courtyard. The main building has a frontage to Baring-road on the north and to High-street South on the west, and consists of the public hall, council chamber, municipal offices, and court house, against which the fire station abuts; east of this block are the library and the technical school. South are the baths and sanitary offices. The ground floor of the main building is occupied by municipal offices entered from the High-street South, and also from the courtyard on the east; entering from the High-street on the right is the Town Clerk's office and the Councillors' staircase. The hall is far too small, and is badly lit; beyond the hall is the small public hall with service accommodation; on the left are the Surveyor's offices with the Accountant's department beyond, with its own entrance. The corridor is badly lit by borrowed light from the offices. The court house has a separate entrance in High-street South, and occupies the ground floor of this wing of the building. The public and prisoners' entrance are in the courtyard at the back, but are too close together. The public hall on the first floor has a separate entrance in Barking-road, reached by a flight of steps, passing lavatories and cloak-rooms, to a vestibule out of which is a corridor on the right connecting the council chamber with the public hall. The hall itself occupies the full length of the Barking-road front, and is capable of seating 1,200 persons; the platform and retiring-rooms have a separate exit at the east end of the hall. Private exits are necessary, but so many entrances are a weakness, taking the place of a grand portico or principal entrance such as one would expect in so important a building. The library and technical school is a compact building; a well-lit porch and lobby leads right and left to the reference library and reading-room and a top-lit central library with a gallery. The entrance to the technical school is in Barking-road, with lavatories and committee, needlework, and cooking rooms on the ground; the school of art, chemical laboratory, and lecture-room are on the first floor.

The engine-house and swimming-bath front west and south and are entered from the High-street. The latter is set back from the road and approached through a garden. There is a well planned entrance hall for men and another for women, with a central office with a hatch-way to each hall for distribution of tickets and towels. There is no distinction of class. The bath is shown with rounded corners, a good constructional feature, but it would disqualify it from use by clubs for swimming matches or polo. On the south again of the bath are the sanitary offices, washhouses, and mortuary; the coroner's court is on the floor over.

The author has repeated the same trick which he adopted in his design in the Cardiff competition, of cutting out the elevations and mounting them on tinted paper; this pleases the public, but it cannot hide the discrepancies of a weak elevation. The materials are presumably brick, stone, and slate. There is a square tower, and a number of features that leave no impression on the mind; in the elevations the buildings look connected, in reality they are too much broken up and too fussy in detail to ever impress the public as the buildings of a large municipality.

The second premium has gone to Messrs. Spalding & Cross. Their plans are also much broken up. There are three buildings each allowing of future extension; the arrangement of the requirements is similar to that in the first design. The main block has the advantage of a fine central hall and grand staircase leading to the public hall; except for this feature the ground plan is dictated by utilitarian motives, and is used for public offices and the police-court. The police-court would have been better for the public had the entrance been nearer the court; as it is, the public would collect in the corridor before the private offices. The council chamber and offices have a well-planned staircase next the square tower at the corner of Barking-road and High-street South. The library and technical school is nicely planned. The library has a square hall top lit off which open the various reading rooms, and next the entrance, the librarian's house is cleverly contrived as part of the building. The technical school has its workshops on the ground floor and the school of art over them and the reading rooms. The swimming bath is well contrived, but the entrance arrangements are not so good as in the first design. The buildings were to be executed in red brick and stone dressings and red tiles, though not imposing and with some unsightly gables it would have formed a picturesque group.

The most dignified design sent in is by Messrs. Baggallay, Ashley, & Armstrong; their scheme has breadth and an architectural treatment entirely lacking in the premiated designs. The first premiated design is a collection of buildings admirably adapted to the working requirements; the rest and restraint of the better proportioned design has been passed over by a public body whose requirements are so multitudinous. The block plan was so badly hung it was impossible to see the exact arrangement of the scheme. The main elevation is treated as one façade, the central part devoted to the public hall and offices on the left, the library and technical school balanced on the right by the court house and council chamber. The elevations are dignified and simple, the ground floor of the central block is a plinth on which rests the Ionic Order, whose well-proportioned cornice extends round the whole building.

Another design on symmetrical lines is that by Messrs. Lanchester, Stewart & Rickards. It has an interesting exterior, but the planning is not so good; moreover, the design depends for its effect on rather extravagant features in a tower and cupolas that would be difficult to include in the money limit.

Mr. Hatchard Smith's design looks well in perspective, but the plan is not good, and suffers from narrow, ill-lit corridors and inadequate staircases.

THE SANITARY INSTITUTE CONGRESS BIRMINGHAM.

The proceedings of the three sections in connexion with this Congress commenced on Thursday last week, in Mason University College, Birmingham. Section II. (Engineering and Architecture) met in the Medical Lecture Theatre, and the President, Mr. W. Henman, delivered the address which was printed in our last issue, page 285.

On the motion of Major Lamorock Flower, seconded by Mr. Lewis Angell, a vote of thanks was accorded to the President, who briefly replied.

The Construction and Ventilation of House Drains.

The following paper, by Professor A. Bostock Hill, was then read by Mr. T. R. Lowcock:—

"It might at first sight be thought that a subject like this in the present stage of sanitary science had been definitely settled, but as a matter of fact we find that on some points authorities still hold divergent views. The question of amount of fall, materials of pipes, &c., no doubt are agreed upon, but certain other points give rise to controversy on different forms of procedure in different districts. I have not the least intention to occupy your time by reiterating those parts of the subject upon which all are agreed, but I desire for a few moments to call attention to certain points, especially in connexion with what are known as compound drains, more particularly as this subject has had of late a local interest. This question of the relation of house drains to so-called compound drains and sewers has been forced on public attention by certain well-known decisions of the High Court; decisions given mainly to settle the point—what is a drain and what is a sewer? The subject is of importance because sewers by Section 13 of the Public Health Act are vested in the local authority, while drains, of course, are the property of the private individual.

In the past, at all events in the Midlands, it has been customary for the small contributory drains from a row of houses to join a larger one which connects with the public sewer. Most of the difficulties have arisen in cases of this kind. As regards the construction of these drains, the size and methods of disconnexion and ventilation are the chief points to be considered. As to size of drains, the smallest which will convey the necessary quantity of liquid is certainly best for reasons of cleanliness. From a single house a 4-in. pipe is ample; yet I have been very surprised to find that in cases of recently-erected cottages a 6-in. pipe has been insisted upon by some surveyors, and, as far as I can understand, the only reason urged for this is the less likelihood of the pipe becoming blocked. But, even if this be true, which I take leave to doubt, there are many corresponding disadvantages. From small houses the soiled water chiefly comes down in gushes; the pipe itself, if it be as much as 6 in, is never nearly filled, but the sides get splashed, and they are in a very short time dirty, and have on their surfaces matter in a state of

putrefaction. Again, it is impossible to flush a pipe as large as 6 in. coming from a single small house, so that, although such a pipe may not become so frequently stopped up, still, it is in a condition in which sanitary science has conclusively proved a house drain should not be. It is, however, on the questions of disconnexion and ventilation that the greatest differences occur. The by-laws in many towns state that every drain shall be cut off by an intercepting trap from the sewer. The judges have decided that a so-called compound drain on private property is a sewer; therefore, say certain authorities, we must insist on the presence of an intercepting trap between each of the contributory drains, and the common drain which has become a sewer.

Let us suppose for the sake of argument that legally a compound drain, though on private ground, is a sewer. As the by-laws were formulated some years previous to the legal decision, we may take it as at least doubtful whether the compound drain was intended by the sanitary advisers of those who framed the by-laws to be so considered; and we may also consider whether though legally a sewer it is desirable, from a sanitary point of view, to treat it as such, as regards our methods of interception and ventilation. Let us consider this for a few moments. The object of a drain is to remove, as quickly as possible, from the neighbourhood of the dwelling, foul water which has passed into it. The law here steps in, and those who choose to consider it binding insist that at each junction of the sub-drain with the compound drain (legally a sewer) there shall be a disconnecting trap between the house drain and the compound drain, so that in a row of six houses we shall have six intercepting traps between the various sub-drains and the compound drain. Each of these traps holds a considerable quantity of liquid and solid matter, and as a trap is an obstruction to the regular flow of the liquid passing through the drain, each of these syphons becomes for the time being a small depositing tank where solids in suspension precipitate themselves. The compound drain is treated in one of two ways: either it is made to discharge into the street sewer without an interception trap at all, and connected with a ventilating shaft running up to the roof of one or more houses, or else an intercepting trap is put just where it enters the road, an air inlet as in the case of the other traps being provided, and a ventilating shaft being taken from it at or near its highest point. In the latter case we ventilate only that part of the sewer which is on private property. In the former case we utilise private property for the ventilation, to some extent at least, of the public sewer.

Under this system, which I regret to say is becoming common in many instances in the Midlands in new property, the following must of necessity occur. Each of the syphons on the branch drain holds foul water; in the case of the house having a water-closet, which is the rule at the present time, the trap holds fæcal matter as well. The inlet which is on the drain just on the house side of the interception trap, and which when no water is coming down may act as such, becomes an outlet every time a flush of water is sent down, and the fouled air which the length of house drain contained, coupled with the gas which has been given off by the fouled matters in the trap, is discharged into the air in close proximity (in some instances not more than 6 ft. or 7 ft.) to the back-doors of the houses. My experience, then, is that from these so-called inlets, acting frequently as outlets, constant smells from foul gases arise, and I have had ample evidence that the tenants complain loudly of the existing state of things. The diagram which I have here shows an actual occurence observed by a sanitary official in Birmingham, where it will be seen that the so-called inlet is being used as an outlet, while the flushing of the closet is performing the function of a bellows, and thus enabling the children of the cottages to amuse themselves by utilising the soiled air from the house-drain for the purpose of blowing up their miniature bonfire. In a close and crowded neighbourhood such a condition of things is undoubtedly bad, even if there be no specifically contaminated matter in the drains; but in the case, say, of typhoid fever existing in property drained in this way, it seems to me that even if disinfection of stools had been carried out in the best known possible way, there would be considerable risk of further dissemination of the disease. It is certainly undesirable to store the sewage even for a short time near premises; and I am strongly of opinion that the method which I have described, while no doubt complying with the letter of the law, induces a state of things, from the sanitary point of view, very much worse than the system which it superseded. I have known of instances where, to avoid the odours arising from these co-called inlets in front of the intercepting trap, tenants have on their own account stopped up the opening, and under the circumstances, in my opinion, they are quite justified in doing so.

Closely connected with this question is that of the ventilation of drains and sewers. I have been somewhat surprised to find that many surveyors at the present time are recommending the ventilation of sewers up houses on private ground. Such a proceeding is—as, I believe, I have shown on other occasions—attended with considerable danger to health; and I wish to enter here a protest against a method which I believe to be utterly wrong in principle, and which tends to distract public attention from the real source of the nuisance, and which palliates an evil instead of removing it.

It is common knowledge that nearly all newly-laid sewers on the separate system, if they be ventilated by ventilators at the crown of the road, are, when first put into operation, a nuisance to the public. It is equally well known, I believe, that the cause of this nuisance is the stagnation of sewage, the deposition of solids in some portion of the sewer, consequent putrefaction, and the production of offensive gases, so that when a sewer gives offence to the nose it is a sign that it is not doing what it was intended to do, viz., carry fresh sewage, which in itself is always inoffensive. When this state of things occurs the public demands that the nuisance be abated. Owing to the very large number of schemes which have been completed of late in the smaller towns and rural districts these complaints have become quite common, and there has been a tendency, which I consider to be unscientific, to endeavour to remove the nuisance from the nose, instead of removing the cause which produces it.

It is no part of my subject to-day to deal with this question as it refers to public sewers, but I do wish to take this opportunity of entering my protest against some of the systems which are officially being carried out, and notably that which, instead of preventing the formation of noxious gases, tends to bottle them up, and discharge them some few feet above the roofs of private houses. I have on a previous occasion shown instances where, I believe, a system similar to this has been productive of suffering and death, and I may say that acting on my advice in a neighbouring town, for which I act as Medical Officer of Health, all ventilators of sewers up private houses have been removed by the Corporation.

It is to be regretted that in considering a question of this kind the matter should be treated as one belonging only to the department of the surveyor. In matters sanitary, as in other professional matters, no doubt there is a tendency at the present time to specialise unduly, but while it is the duty of the sanitary engineer to formulate and carry out a system for the removal of sewage and waste waters, it is no reason why the medical side of the question should be forgotten, and I maintain that this can only be definitely and properly settled by the harmonious working of medical and engineering experts. In this matter of ventilation of sewers it is no doubt comparatively easy to abate the nuisance as far as the nose is concerned, but I think in the past we have been too ready to forget the real meaning of the proverb that the remedy may be worse than the disease."

Combined Drainage.

The discussion on the paper was taken at the conclusion of the reading of the next paper, by Dr. Priestley, which was entitled "Combined Drainage: Its Pros and Cons," and of which the following is an abstract:—There has recently been such difficulty in connexion with combined drains, which are "sewers" in the present state of the law, and for which the Sanitary Authority is liable as to repairing or relaying, owing to the combinations not having received at the time of construction the formal approval, sanction, order, or direction of the Sanitary Authority concerned, that there is a tendency to-day to look askance at and refuse all plans of drainage showing a combined system. Of recent years, too, Sanitary Authorities have had to expend thousands and thousands of pounds upon combined drains, so that they felt justified in insisting upon a separate drain to each house or building. Such an extreme view is unwarranted, as all sanitarians are agreed that a first principle in drainage is to keep the drains as far as possible outside, so that, in the event of defects in connexion with the drains, no harm shall result to the occupiers by the escape of sewer or drain gas—a condition of things which may and does arise even in these days of expert drain laying, farm settlements, &c. Detached and semi-detached houses can have a separate drain to each house, the drains being kept easily outside. In the case of a row or terrace of houses, a back line of drainage can be provided, discharging into a branch sewer in a side roadway, or be turned into the sewer in the roadway in front, either through an open uncovered passage-way between two adjacent houses (and not less than 5 ft. for the width of such passage-way), or by the side of one house, or even, where necessary, through and under one of the houses. By branching each house separately into this back line of drainage all drains are kept outside, or, at the most, one house only has a drain running under and through it; whereas, if a separate drain and separate connexion into the main sewer is insisted upon, each house has to have a drain underneath and through it. How many houses ought to be allowed in a combined drain? In practice I would restrict the number to six (or less), and have the combined drain intercepted and ventilated *separately;* but with more than six houses, the main drain might be regarded as a "sewer," and treated accordingly—each house drain being separately intercepted therefrom and ventilated. In the exceptional cases, where the combined drain has to pass under a house, great care must be taken in laying the same, *e.g.*, manhole back and front, joints absolutely air-water-tight, drain (if not iron) embedded in concrete, intercepted trap provided, &c. As to the law: in the metropolis, with which I am concerned officially, the recent case of Appleyard *v.* the Lambeth Vestry has laid down the law very simply. Section 74 of the Metropolis Local Management Act, 1855, allows a combined system which has, previous to laying, received the formal order of the Vestry or District Board concerned; whilst Section 17 of the Metropolis Local Management Amendment Act of 1862, extends the powers of the previous Act beyond Vestries and District Boards (which were created in 1855) to Metropolitan Commissioners of Sewers, who came into existence in 1848. Prior to that date, all combined drains constructed are, in London, "sewers," repairable by the Sanitary Authorities—a very large order. The new Public Health (London) Act, 1891, gives no definition of drain. In districts served by the Public Health Act, 1875, a combined drain receiving the drainage of two or more houses is a "sewer," repairable by the Sanitary Authority, but the Public Health Acts Amendment Act, 1890 (Section 19 of Part I.), gives the Sanitary Authority power to deal with a combined system, and to recover the expenses incurred in dealing with such combination under Section 41 of the 1875 Act. The 1890 Act is permissive. Conclusions:— (1) Where a scheme of drainage is simplified, and the drains kept outside, by means of a combined system (or even in the rare case when the combined drain has to be taken through and under one house), it ought to be allowed, instead of insisting upon a separate drain and passing through and under each house—such a combined system being best hygienically, financially, or otherwise. (2) When six (or less) houses are combined, the combined drain is to be intercepted and ventilated separately as a whole, but where more than six houses join, the main drain had better be treated as a "sewer," and each house separately intercepted therefrom and ventilated—the main drain itself not being intercepted, except in the rare instance where such main drain passes through and under a house or building.

The President, in opening the discussion, said it was gratifying to him to find that those who were taking note of sanitary matters, especially drainage, were aware of the evils of the multiplication of traps. He always condemned the "model" by-laws of the Local Government Board, which were far from model, and he hoped that the Board would discard them, and substitute new and reasonable ones for them.

The discussion was continued by Messrs. T. J. Perry (Camberwell), Close, T. Longdin (Borough

Surveyor, Warrington), and Councillor A. S. Campkin (Cambridge).

Mr. Lewis Angell said that in West Ham they had succeeded in reverting to the old condition of things—of throwing the cost of repair of private drains upon private owners. He was afraid that could not become general, except by a special Act.

Mr. S. Lowcock said that he agreed that the model by-laws of the Local Government Board should be altered, but he thought that a meeting should be held to decide what was wanted; it did not appear to be at all clear at present. He agreed that the multiplication of traps was to be avoided; but he did not think that they should all be done away with. He thought that the drains of houses should be treated in sections—say of half a dozen houses—and cut off from the sewer. The main sewer should be treated by itself and the section by itself.

Mr. E. Day (Worcester) said that some outlet for sewer gas should be provided. He favoured the use of the exhaust shaft with a destructor at the top to draw vitiated air from the sewer and destroy any microbes which might exist.

The President said he thought they had to direct attention to the fact that it was possible to prevent the formation of sewer-gas. Fresh sewage did not give off gas, but in the traps, one to every house, were many gallons of putrefying matter, which at every flush was thrown into the sewer and produced gas. From what had been said, he thought that they were over-ridden by law. He thought that the house drain should end at the boundary of the site, whatever that boundary might be, and that the rest should be public property.

In his reply, Dr. Bostock Hill said he was opposed to the adoption of the exhaust system. With the hundreds of miles of sewers there were in Birmingham it was impossible to get the necessary draught; the sewers were not air-tight, and the expense would be prohibitory. Moreover, the principle was wrong. They must prevent the formation of the gas, and the rearrangement of the sewers for that purpose was one of the greatest problems which Birmingham and other large cities had to face in the future.

Dr. Priestley also briefly replied.

The Quantity of Water Required for Domestic Flushing Purposes.

The following paper, by Dr. Charles Porter, of Stockport, entitled "The Quantity of Water Required for Domestic Flushing Purposes, and the Influence of Intercepting Traps Thereon," was, in the author's absence, taken as read:—

The water-carriage system of refuse disposal, which is yearly becoming increasingly prevalent throughout the country, aims at the cleanly and rapid removal, through drains, of excremental matter from the neighbourhood of dwellings. For its successful application and working adequate flushing of water-closets and house drains is absolutely essential, in order to prevent the latter from becoming "nothing better than elongated cesspools charged with foul festering filth," as was shown to be the case at Maidstone. The recent Government report on the typhoid epidemic in that town tells us that half its 6,000 odd houses have water-closets without any mechanical means of flushing, and that the Sanitary Authority's lamentable "failure of duty in this respect has led to the gravest consequences," a large number of the typhoid cases being officially ascribed to soil and air-pollution from blocked and defective drains. In advocating conversion to water-carriage we ought therefore to satisfy ourselves that the public health is protected from the results of such deficiencies, and with this object in view I was directed in April last by the Corporation of Stockport to ascertain experimentally the quantity of water required to efficiently flush a water-closet with drain and intercepting trap. Upwards of 120 experiments were shortly afterwards carried out on the lines adopted by the Sanitary Institute in 1893, the apparatus used being the following:—

(*a*) Duckett's wash-down closet, with S-outgo, and afterwards a Unitas wash-out closet.

(*b*) Water-waste-preventing cistern graduated for 6, 4, 3½, 3, 2½, 2, and 1½ gallons, and connected to closet by 5 ft. of 1¼-in. vertical lead piping.

(*c*) 47 ft. of glazed earthernware 6-in. and 4-in. pipe drain, with puddle joints, and having a right-angled curve one pipe's length from closet outgo. In upper surface of each length of pipe was cut a slot 15 in. to 18 in. long and about 2 in. width, for inspection purposes.

(*d*) Disconnecting traps (or "interceptors") of a good type, attached to end of drain, discharging over a weighed pail, and having glass windows inserted in the lowest part or "throat."

Fæcal matter and paper, from a "Rochdale Pail," filled by actual use at a mill, were used for charging the closets, 4 ozs. to 6 ozs. being employed in most cases, but 8 ozs. and 12 ozs. were used in a smaller number. In the Sanitary Institute experiments artificial material was used for this purpose.

The First Series of trials (50 in number) were made with a 4-in. drain (fall 1 in 40) and 4-in disconnecting trap. This trap was filled by 4 pints of water and at the lowest part measured 3½ in. transversely and 4 in. vertically. Flushes of 3, 2½, 2, and 1½ gallons were employed, the result being that 3 gallons invariably sufficed to thoroughly flush closet, drain, and 4-in. trap; a 2½-gallon flush generally failed to clear the 4-in. trap; with 2 gallons the interceptor was not once cleared, and most of the solids were left in the trap. By repeated 2-gallon flushes in rapid succession causing a head of water in the drain, the trap was eventually cleared with a rush, but this did not happen if one flush were allowed to trickle away before the next followed it. A 1½-gallon flush was found to be of little use. The drain was never cleared and became rapidly blocked.

The Second Series included twenty-one experiments, and was made with a 6-in. drain (fall 1 in 60) and 6-in. disconnecting trap, which, it is noteworthy, required 12 pints of water to fill it, and at its lowest part measured 5⅛ in. transversely and 5⅜ in. vertically. Flushes of 6, 4, 3½, 3, and 2½ gallons were used, and it is a remarkable fact that though 3 gallons and upwards sufficed to clear the closet and drain each time, the 6-in. trap was cleared by a 6-gallon flush in only 2 out of 4 cases; 4 gallons cleared it in only 1 out of 6 cases, and anything less that 4 gallons altogether repeatedly failed to clear the trap.

The Third Series numbered twenty-two experiments with a 6-in. drain and a 4-in. intercepting trap. With a 3-gallon flush the closet, drain, and trap were efficiently cleansed every time, but a flush of less than 3 gallons failed each time to clear the drain and to reach the trap.

The Fourth Series (eighteen trials) with a Unitas wash-out closet, 4-in. drain and 4-in. interceptor, flushes of 3, 2½, and 2 gallons were used; 3 gallons sufficed to clear the trap in two out of six cases. With smaller flushes, the trap retained a portion of the charge in every case; in five cases the drain was not cleared, whilst in eight the closet trap was not cleared, due evidently to the inherent faults of the wash-out closet. I shall be pleased to supply fuller details of these results to any one interested in the matter, and I venture to submit the following conclusions:—

1. That 3 gallons is the minimum amount that can be relied upon for efficient flushing, *i.e.*, prompt carriage of dejecta through closet, drain, and interceptor to sewer, even with a good form of wash-down closet, well laid 4-in. or 6-in. drain, and good 4-in. interceptor. 2. That if an inferior type of closet be used or if the intercepting trap exceed 4 in. diameter, 3 gallons is clearly not sufficient for effective flushing. The proper remedy then, however, is to correct such structural deficiencies rather than to increase the flush. 3. That if no intercepting trap be employed a flush of 2½ gallons is the minimum amount that can be relied upon to efficiently cleanse the closet-trap and drain. 4. That the invariable employment of a disconnecting trap as recommended by the Model by-laws is far from being an unmixed benefit, and owing to the obstacle the disconnecting trap presents to the cleansing of house drains, its use should be strictly limited to those dwellings inside which a drain opening exists, *e.g.*, in the cellar, and that if such drain-openings inside houses were prohibited in new dwellings disconnecting traps might, with great advantage, be entirely dispensed with.

There is much reason to believe that we have hitherto exaggerated the potency of sewer air; assuming, however, that it is noxious in its effects the object of a disconnecting trap is wholly gone if we keep all drain openings outside our dwellings, and, having done this, it is absurd to continue to insist on disconnecting traps which only diminish the efficiency of the fiush of water.

Is Economy in Water Effected by the Use of Waste-Water-Closets?—In order to elucidate this question two blocks of exactly similar houses were recently selected in Stockport. At the request and expense of the Sanitary Committee the water supplied to each block between 7 a.m. on October 28, 1896, and 7.30 a.m. on May 13, 1897, was metred by the water company, with the following results:—Lot A. Ten houses with waste-water-closets used 65,720 gallons, or 33·3 galions per house per day. Lot B. Fourteen houses with ordinary water-closets used 151,320 gallons, or 54·8 gallons per house per day. Showing a saving of exactly 21·5 gallons per house per day in slop-water houses. In a similar and more recent experiment in Manchester, the City Surveyor, Mr. T. de Courcy Meade, M.Inst.C.E., has curiously enough obtained an exactly identical result.

Sewage Disposal in Connexion with Tidal Estuaries.

This was the title of a paper by Mr. H. Bertram Nichols, who gave some particulars of and statistics relating to what has been done in some of the principal seaside towns. The author showed, from a tabulated statement, that the towns on tidal waters generally discharge the crude sewage into the sea or tidal river, with the outlet at or below low water of ordinary spring tides. In several cases the sewerage schemes have been carried out many years ago, and the probability is, in some instances, if the same schemes were placed before the Local Government Board for sanction at the present time, they would be rejected in consequence of provision not being made for satisfactory treatment of the sewage before its discharge. It was always necessary that float experiments should be made to define as nearly as possible the set of the currents near the shore in connexion with sewerage schemes for all towns and districts situated on tidal waters; and it was becoming now a question as to whether it was not desirable to at least clarify the sewage before its discharge. Where the currents had a tendency to set back and leave floating matter on the foreshore some provision should be made both for storage and treatment, and the question arose as to what form the storage should take, under what system the sewage should be treated, and under what conditions it should be turned into tidal waters. Many towns adopted the method of storing the sewage in a culvert or intercepting sewer, but local conditions to a great extent affected this question, it being advisable in some cases to store the sewage in an underground storage tank. The crude sewage in most seaside towns was let out at points a little below low water on the receding tides, and the principal towns on tidal waters were so situated that the sewage was discharged and carried well out to sea before the tidal return. Clarification of the sewage was not enough where the volume of the sewage was great in comparison with the flow of a tidal river. Under such conditions it was advisable that the sewage should be specially filtered through coke breeze, clinker, or other suitable materials of sufficient area and capacity, or passed through land before final discharge. The removal of the sludge became an important factor where there was a likelihood of any sewage matter returning to the beach, and in some cases this was accomplished by interception in large catchpits before entering the outfall culvert or tank. In other cases it could be taken out to sea, as at Falmouth, where the sludge was taken by hopper into the bay. Seaside watering places and health resorts, of course, had to be particularly careful as to the point of discharge of their sewers, especially where seabathing was participated in, and it had become essential that the sewer outlets should be carried to low water of spring tides and to points where the currents set out to sea. The author had arrived at the following general conclusions: That only where there was a rapid seaward current was it permissible to discharge the crude sewage into tidal waters, and then only on the receding tides. Where float experiments, over a lengthened period, showed that there was a likelihood of sewage matter returning to the point of outlet, or being carried on to the foreshore, it was advisable for the sewage to be treated. In the majority of cases, clarification was all that was necessary, and this would be accomplished by precipitation in tanks, or on the biological principle as adopted at Exeter and other places. To ensure perfect immunity from danger, however, the outlets should always be carried to points where the currents tend seaward.

A discussion followed, in which the following gentlemen took part:—Dr. Vacher, Messrs. Baker (President of the Clerks of Works Association, Portsmouth), Lowcock, A. J. Martin (Exeter), Moss Flower (Bristol), C. J. Jenkin (Willenhall), E. Rushton (Cleethorpes), W. J. Gilliland (Belfast), T. H. Smith (Blackpool), J. Munce (Belfast), A. S. E. Ackerman (Westminster), and the President.

Mr. Nichols having replied, and a vote of thanks having been accorded to the readers of papers, the proceedings were adjourned until Friday.

In the afternoon a Congress garden party was given by the members of the Health Committee of the Corporation at the Egbaston Botanical Gardens, and in the evening Dr. Christopher Childs lectured to the Congress in the Medical Theatre, Mason College, on the "Prevention of Pollution of our Streams and Rivers."

On Friday, the Engineering and Architecture section again met in the Medical Lecture Theatre of the College, Mr. Henman presiding.

Some Sanitary Defects in Rural Districts.

Mr. G. H. Smith read a paper on this subject, in the course of which he made suggestions for the remedy of the defects. He placed the difficulty of obtaining a pure water supply first. The supply, being drawn chiefly from wells and watercourses, was liable to serious pollution. It was nothing uncommon to find the well and the cesspool in close proximity, and the well consequently suffered. Rivers and watercourses were other sources of water supply in country districts which were liable to easy pollution—for instance, farmers turned streams into washing places for sheep. As a remedy for this state of things he advocated an increase of the powers of Rural Authorities. Another sanitary defect which he dealt with was the condition of many village cottages. The insanitary state of such houses arising from bad buildings and insufficient repairs was added to by sanitary conveniences of the most primitive type. Under such conditions existed many of the agricultural labourers of the country, and one wondered that they were not more subject to disease and early death. It was only their outdoor life which saved them from this. The most practical remedy was to grant power to the Parish and Rural Councils to obtain land and build cottages wherever it was considered necessary, and the money to do this should be raised on the security of the local rates. In conclusion, he contended that all inspectors of nuisances should hold certificates granted by that Institute, and, in addition, they should not be allowed to hold any other office.

Mr. A. Davenport described what had been accomplished in an essentially rural district covering about forty townships. A proper water scheme had been inaugurated by voluntary effort on the guarantees of the owners of property and of residents.

Mr. H. Denham thought there should be no distinction between the powers of Rural and Urban Authorities with relation to the water supply.

Mr. R. E. Smith (London) suggested that the dwellings difficulty might be overcome if the erection of wooden cottages was permitted.

Mr. W. Bland (Manchester) however, deprecated the relaxation of the sanitary laws so as to allow of the erection of wooden buildings by private enterprise.

Mr. J. D. Watson (Aberdeen) spoke of the Scottish experience of wooden dwellings as unsatisfactory.

The President said that matters of water supply for country places were dealt with in too small a manner. If it were compulsory for large cities drawing their water supply from a distance to make provision for the supply of water to villages on the way, the difficulty as to the water supply of those villages would be largely removed. No doubt there were districts where wooden houses might be erected, but they should always be looked upon as of a temporary character.

"The Purchase of the Catchment Areas as a means of protecting the Sources of a Public Water Supply" was a subject introduced by Dr. J. Spottiswoode Cameron (Medical Officer of Leeds). Dr. Cameron pointed out the different ways in which public water supplies might be polluted, and urged that not only should authorities have power to acquire land for water storage, but they should have similar power with regard to the gathering grounds.

Mr. Whittaker (Croydon), the Rev. Dr. Cox (Brixworth) and the President having spoken,

Mr. James Mansergh, M.Inst.C.E., read a paper on the

Birmingham Water Scheme.

Mr. Mansergh said that the area supplied by the Water Committee amounted to 130 square miles, which was 10 per cent. in excess of the county of London. The development of the area made an increased supply absolutely necessary, and in addition the Committee had to face the possibility of increasing pollution of existing sources. The remedy seemed to be the acquiring of a distant water supply, and the prospects of abundant water and convenience of gravitation made them hit upon the Elan Valley. When they had so decided there was a necessity for prompt action, for the metropolitan authorities were searching for gathering grounds for London. For this reason they found opposition to their scheme when it came before Parliament. There was national opposition, too, for the Welshmen said that this was Welsh water, which should be reserved for Welshmen. The area of the gathering ground to be acquired was fixed after carefully marking the watershed boundaries. The observations of the rainfall on this area satisfied him that they might calculate on obtaining seventy-five million gallons per day for the supply of Birmingham, in addition to the twenty-seven million gallons required for compensation. Mr. Mansergh then described the work of damming up the watercourses so as to transform the valley into lakes, which would submerge houses, such as Shelley's, farms, and a place of worship. These storage reservoirs, he said, would hold sufficient water to provide for a drought of 180 days. From the reservoirs at Elan to the receptive reservoir at Frankley, a distance of seventy-four miles, the water will be conveyed by tunnelling, the extent of which exceeds thirty miles, cut and cover, and iron pipes, and the water will be forty-four hours in completing the journey. He then described the formation of the village for the workmen. The lecture ended with a succession of photographic views of the progress of the work, shown by means of lantern pictures.

Sir Joseph Fayrer, President of the Congress, moved a vote of thanks to Mr. Mansergh for his lecture.

The President of the section seconded the motion, and it was adopted with acclamation.

Mr. Mansergh briefly replied.

The concluding paper, on "Plenum Ventilation," by Dr. S. Barwise (Derbyshire), described the system of ventilating buildings by admitting fresh air towards the ceilings of rooms, and extracting the foul air by means of outlets near to the flooring—a system which has been adopted at the Birmingham Technical School and the New General Hospital. He explained the system as it has been carried out at schools at Bolsover, Derbyshire, at Leicester, and at Birmingham.

A vote of thanks having been accorded to the readers of papers, the proceedings of the section concluded. In the afternoon Mr. Henman took a party of gentlemen over the new General Hospital and explained the ventilating and warming arrangements.

The two other sections also met in Mason College on Thursday and Friday. Before Section 3 (Physics, Chemistry, and Biology) the following were some of the papers read and discussed:—

"Interpretation of Results of Water Analysis," by Dr. S. Barwise; "Recent Progress in the Methods of Water Analysis," by Mr. C. E. Seyler; "Some Observations on the Natural Purification of Sewage," by Dr. H. Kenwood; "The Quality of Sewage as Influencing its Disposal," by Mr. S. Rideal; "The Biolysis of Sewage," by Mr. W. D. Scott-Moncrieff; "Bacterio-Chemical Analysis of Sewage and Sewage Effluents," by Mr. W. E. Adeney; and "The Flora of Sewage," by Professor R. Boyce.

The concluding meeting of the conference was held on Friday afternoon in the Medical Lecture theatre, Sir Joseph Fayrer presiding. The Secretary (Mr. White Wallis) reported that 549 tickets had been issued to members, 880 to delegates from 431 sanitary authorities, and 400 to associates. In addition 450 complimentary and other tickets were issued, making a total of 1,979—about 50 per cent. more than the last Congress. The attendance at the sections had also been good. Reports as to the work done in the various sections were considered, and the resolutions adopted at them passed on to the consideration of the Council.

The President then announced that the next Congress would be held at Southampton on August 30, 1899. Votes of thanks were passed to the Lord Mayor and Lady Mayoress, the Corporation, the Councils of Mason University College and the Midland Institute, to those who had shown hospitality to the local committee and secretaries, the press, and the president, and the meeting ended.

At the invitation of Alderman Baker (chairman of the Birmingham Tame and Rea District Drainage Board), a party of about one hundred members paid a visit to the sewage farm on Friday afternoon. Alderman Baker conducted the party over the works at Saltley, and thence over the farm to Tyburn, where an inspection of the buildings and the produce grown on the farm was made. Excursions were also made by parties to Dudley Castle, Whitacre, and the Croft Granite Works, near Leicester, and, on Saturday, to Stratford-on-Avon and Warwick.

In connexion with the Congress, a popular lecture was given on Friday evening, in the large theatre of the Birmingham and Midland Institute, by Dr. Alexander Hill (Vice-Chancellor Cambridge University) his subject being, "Unnatural Deaths."

Illustrations.

THE illustrations in this issue are all of buildings in Newcastle-on-Tyne, and are all referred to in our leading article of this week, which deals with the architecture of that town.

On the first sheet are given three of the most important buildings by the late Benjamin Green—buildings of the old-fashioned Classic architecture type; and three recent buildings by Mr. F. W. Rich—a printing establishment, a Board school, and a simple but very pleasing street front.

The second plate contains illustrations of the exteriors and interiors of some of the Newcastle churches.

On the third sheet are grouped some smaller buildings of various types—a Board school by Messrs. Armstrong & Knowles, the Home for Incurables, and two street façades, by Mr. Shewbrooks; and the Northern Assurance Company's Offices by the late R. J. Johnson.

The fourth sheet contains measured drawings of the famous lantern of St. Nicholas Church, lent by Messrs. Oliver & Leeson, in whose hands the church was placed some time ago for repair.

The fifth sheet contains a view of All Saints', one of the older churches of the town, and a view of premises in Westgate-road from a drawing lent by the architects, Messrs. Armstrong & Knowles.

The sixth sheet contains illustrations of two large business buildings by Messrs. Oliver & Leeson, from drawings lent by the architects.

We may take the opportunity of expressing our best thanks to the architects who have kindly lent us drawings or photographs to assist in illustrating our article.

HEALTH EXHIBITION, BIRMINGHAM.

THE concluding meetings and excursions of the Sanitary Congress at Birmingham took place on Saturday last, but the Health Exhibition held in connexion with the Congress will not be closed until October 22. It was opened on September 27 by the Lord Mayor of Birmingham, and may be said to be one of the most successful exhibitions ever held by the Sanitary Institute; not only are the exhibits numerous and interesting, but the attendance appears likely to be a record one. Up to Saturday last no fewer than 13,000 persons had visited the Exhibition. Bingley Hall, which has been utilised for the occasion, is undoubtedly well adapted for such a purpose as this, having a large and well-lighted area and a wide gallery extending around the four sides. Its condition prior to the exhibition appears to have been far from hygienic, but the removal of about four tons of dirt scraped from the walls and the plentiful use of Duresco on the walls, and on panels of canvas fastened to the girders, have made a wonderful difference to its appearance. A word of praise is certainly due to Messrs. J. B. Orr & Co. for the admirable manner in which the decoration

of the hall has been carried out; some of the stencilled designs are excellent, and have been specially prepared for the positions they occupy in the hall.

Considerable care has been exercised in the location of the various exhibits, a rough classification having been made, which is of great convenience to the visitor. The exhibits are ranged alongside ten aisles, and, speaking broadly, the right-hand half of the hall is occupied by sanitary appliances, and the remaining half of the area and the whole of the galleries by miscellaneous exhibits. In the first aisle, commencing at the right hand side of the area, we find the most important stands of sanitary fittings, the names of Shanks & Co., George Jennings, Doulton & Co., and Thomas Wragg & Sons, being among the more prominent. The next aisle includes somewhat similar exhibits by Twyfords, Adams & Co., George Skey & Co., and others, together with a number of drainage appliances. The principal stands in the third and fourth aisles are those of Burn Bros., Hughes & Lancaster, J. Duckett & Son, and Oates & Green. Beyond these aisles there is little of interest to the architect or builder until the ninth and tenth are reached. In these are important exhibits of water-filtration and sterilisation apparatus by J. Defries & Sons, James Edmund Webb, and Maiche. A number of valuable drawings have been lent by the Corporation of Manchester, Mr. William Henman, and others, but these are scattered about in so many places that it is almost impossible to obtain any connected idea of their teaching. We had the opportunity of pointing out this defect to the courteous curator of the exhibition, Mr. W. H. Knight—who, by the way, is also the curator of the Parkes Museum in Margaret-street, London—and at the same time we suggested that a special space should be reserved in future exhibitions for drawings, and an attempt be made to obtain series of designs illustrating buildings in which sanitary requirements have been carefully studied. In this way valuable information might be imparted respecting hospitals, infirmaries, workhouses, lodging-houses, workmen's dwellings, and other buildings. A department of this kind would undoubtedly stimulate the interest of architects and architectural students.

As the general classification of the exhibits is so well done, it is, however, almost hypercritical to find fault about the placing of the comparatively small number of drawings. We cannot but congratulate Mr. Knight on the success which he has attained in the general arrangements of the exhibition, which is certainly the best of the Sanitary Institute's exhibitions it has been our lot to visit.

At Stall No. 1 Mr. Wm. Eggington, of Birmingham, exhibits a model of his "Portable sewer-gas extractor and destroyer in conjunction with sewer-disinfector." The apparatus includes a fan, which is designed to draw the air from the sewer into a chamber, and thence through a breeze fire; for disinfecting the sewer sulphur fumes are drawn through it. It is claimed that a mile of ordinary sewers can be treated at one operation, but only actual trial over a lengthened period will show whether the inventor's claims are likely to be substantiated in practice. The use of the apparatus would, of course, necessitate the closing of the sewer-ventilators in the district tested, which is not at all an undesirable consummation if adequate ventilation can be obtained in some other way. To say the least, Mr. Eggington's apparatus deserves a trial, but we are not sanguine that it will be generally adopted.

The next stall is that of Messrs. Shanks & Co., and is perhaps the best-arranged in the exhibition. It is not crowded, and everything has an air of cleanliness and quality. Bronze medals have been awarded to this firm for their "Perfecto" bath and "Perfecto" lavatory. The bath is of porcelain-enamelled iron, white inside and white and gold outside. The overflow is the special feature, being quite vertical and straight and of rather large area, so as to facilitate cleaning; the upper part of the foot of the bath is splayed back, and the overflow extends vertically downwards from this splay. The waste-valve is at the foot of the overflow, and is of large area, so that the bath can be rapidly emptied. A hinged, nickel-plated grate, shaped like a quarter of a sphere, is provided to prevent soap and brushes being drawn into the trap and waste-pipe. A beautiful lavatory, with nickel-plated supports and fittings and onyx top, is shown, this also being provided with an easily-cleansible overflow. The "Victorian" hospital sink and bed-pan washer is an improvement of that exhibited at Leeds last year; it consists of a large hopper of white enamelled fireclay, a hinged grid of brass, covered with vulcanite for receiving the bed-pans, a spray and jet forming part of the grid, two sets of taps for hot and cold water, and a three-gallon cistern, which is operated by pressing a button. A new water-closet seat is shown, consisting of a perforated steel frame covered on both sides with vulcanite, which forms a smooth and easily-washed surface; the perforations in the frame are merely to afford a key for the vulcanite. Among other exhibits may be mentioned a silent cistern known as the "Aqua-jet," and a range of two "Odourless" urinals with fireclay cistern. The "Lanyon" closet, designed by Mr. Lanyon, the Belfast architect, possesses some features of interest; it is of the wash-down type with a large water-area measuring about 11 in. by 6 in., and the rim of the basin is about 3 in. wide, the top surface being made to slope inwards so as to prevent splashing over; the seat is specially designed to prevent fouling and the communication of infectious diseases.

Stall No. 3 is occupied by the exhibits of Mr. George Jennings, and is well worth careful examination. The "Duplex Supply and Sanitary Waste-Valve" for baths has been selected by the judges "for further practical trial"; the arrangement for asylums is possessed of considerable merit. The valves or taps are placed under a flat plate of brass level with the top of the bath; in the plate are two dials, that for the water supply being marked off hot and cold, and that for the waste being marked open and shut; each dial can be actuated by a removable key, and not otherwise. Both the supply and discharge are very rapid. The chief feature of Jennings' hospital sink and bed-pan washer is a small chamber, fitted in front with a glazed circular door like the window of a port-hole; in this chamber the bed-pan is placed and washed without fouling the air of the room. The ventilation pipe from the chamber would be all the better for being a little larger; a 3-in. pipe cannot be very efficient. The "Hyback" combined closet and urinal will be of service in railway carriages and ships, as well as in a certain class of public houses. As the name implies, the basin is carried up at the back so as to render it more serviceable as a urinal, while the seat is of horseshoe shape pivoted in the middle, the extended portions at the back being weighted so that the seat, when not in use, remains in a vertical position. At this stall we saw also the "closet of the century," which is a syphonic closet with valve-supply, which can be regulated to give a flush of from two to three gallons. Riker's lavatory is exhibited here; it is of American manufacture, and is noteworthy for the ease with which it can be fixed and removed. It has an iron frame at the back built into the wall, and to this the upper and lower marble back-pieces, the marble slab, and the porcelain basin are screwed; it is provided with a syphonic waste and two swing towel-rails, and may be praised for its compactness and ingenuity. Stoneware conduits for electric wires are shown by Mr. Jennings, their special advantage consisting in the pair of longitudinal grooves formed on opposite sides of each tube. When it is desired to make a connexion with the wires in the conduit, a chisel is placed in the groove and one or two light taps with a hammer suffice to remove the upper half of the conduit; the connexion can then be made and a junction piece inserted in place of the part removed. Sockets for the blind ends of junctions in drains and sewers are also made with a grooved cap, which can be cut off in the same way when it is required to make a connexion with the junction. Mention should be made of the Louis Quatorze lavatory, which is undoubtedly the best-designed sanitary fitting in the Exhibition from an architectural point of view. It has a white marble slab, 4 ft. by 2 ft. 4 in., supported on brass legs and frame, and above the slab is a marble shelf on brass supports. The fittings are of brass, and include a shampooing supply.

Messrs. Doulton & Co.'s exhibits are at Stalls Nos. 4 and 13, which are on opposite sides of the aisle. The "Waverley" lavatory and two baths are fitted with nickel-plated standing wastes and overflows, which are simply hung to the spindles of the waste-knobs and can be easily detached for cleaning. The "Simplicitas" wash-down closet has a water-area only 4½ in. in diameter, while that in the "Simplicitas large water-area" closet only measures about 6 in. by 5 in. Among the well-known decorative work of this firm we noticed an effective panel representing Autumn and Winter, but a green mantel with blue hearth was not soothing.

At Stalls Nos. 5 and 12, Messrs. Thomas Wragg & Sons show a great many drain-traps and gullies, some of good design, but not very novel. Hassall's double-lined drain-pipes are also shown, but these are too well known to need description. A newer form of drain-pipe is that known as Wakefield's, the special feature being the series of corrugations in the sockets, which, while insuring the true alignment of the pipes, do not prevent the cement-grout from passing completely around the space between the socket and the spigot.

A good model of the Septic Tank apparatus for the purification of sewage is exhibited at Stall No. 6, but was not working at the time of our inspection. As the first installation of the system at Exeter has more than once been described in our columns, a detailed account is now unnecessary. The system has evoked a great amount of interest, and bids fair to be the most successful among the numerous systems of sewage purification which have yet been tried on a satisfactory scale.

Messrs. Farrer, Barber, & Co., at Stall No. 7, exhibit a flushing tank, which "has been selected by the judges for further practical trial." They also show Chisholm's pneumatic lavatory, the special feature of which is the syphonic waste. We do not see much advantage to be gained by the application of the syphon to lavatories. If the basin is filled above a certain point the whole of the water is syphoned out, which is to our mind a disadvantage.

We shall have more to say on the Exhibition in our next, when we will also give the list of awards for those exhibits which are of special interest to our readers.

THE LONDON COUNTY COUNCIL.

THE first meeting of this Council after the summer recess was held at Spring Gardens on Tuesday, Mr. McKinnon Wood, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee it was agreed to lend the Islington Vestry 21,010*l.* for street improvements, &c.; St. George's-in-the-East, 3,000*l.* for paving works; the St. Margaret and St. John, Westminster, Vestry, 15,000*l.* for paving; the Strand Guardians, 7,035*l.* for the erection of receiving wards; the Wandsworth Guardians, 11,400*l.* for the erection of a nurse's home; and the Central London District School Managers, 32,000*l.* towards the cost of erecting an asylum at Hendon.

No Tenders.—It was announced that no tenders had been received in response to the Council's invitations for the erection of Benson-buildings, under the Boundary-street scheme or for Abingdon-buildings, under the same scheme, or for cottage dwellings at Brook street, Limehouse.

The Transfer of Powers.—The Council resumed and concluded the consideration of the proposals of the conference which was held some months ago between the Council and the Local Authorities with regard to devolution of powers. Several of the recommendations of the conference were adopted at a previous meeting (see our issue for June 25 last).

It was now agreed—"That the powers of the Council to remove unauthorised signs on getting a magistrate's order be transferred to the Local Authorities, but that power be given to the Council to act in default of the Local Authorities."

It was further resolved:—"That powers be given to the Local Authorities concurrently with the Council to take proceedings with regard to the storing of wood and timber under Sections 197 and 200 (11h) of the London Building Act, 1894, and in regard to the demolition of buildings erected in contravention of the Act, under Section 170, subject to the powers of the Local Authorities being limited under the latter section to cases where they have obtained the convictions upon which demolition proceedings are based."

It was next recommended:—"That the maintenance of the Victoria Embankment and por-

tion of streets adjoining in the precincts of the Savoy and the footways of the Albert and Chelsea Embankments be transferred to the Local Authorities, and that the lighting, watering, and cleansing of the Victoria Embankment and the footways of the Albert and Chelsea Embankments be transferred to the Local Authorities, subject to the maintenance and lighting of the walls of the embankments being retained by the Council."

It was next agreed :—"That the maintenance of main roads be transferred to the Local Authorities ; that the power of sanctioning the closing of streets for repairs be transferred to the Local Authorities ; that the words 'with the sanction of the Council' be omitted from the provision enabling Vestries and District Boards to close or stop up streets during paving or sewerage works; that the power of the Council to require main roads when maintained by a Vestry or District Board to be repaired to the Council's satisfaction be repealed on transfer of such roads to the Vestry or District Board ; that the powers of the Council under the Electric Lighting Provisional Order Confirmation Acts, as regards the appointment of inspectors, provision of testing stations, and exercise of powers with reference to price and energy of the supply of electricity in a district, be not transferred to the Local Authorities ; that the Local Authorities be given concurrent power with the Council to apply to Parliament for powers to make improvements of public utility wholly within their districts, and not intended to be paid for wholly or in part out of the county funds."

The Committee (the Local Government and Taxation) recommended : "That the powers of the Council to make by-laws or regulations for the good rule and government of the county, or any specified part thereto, be not transferred to the Local Authorities."

Lord Onslow moved as an amendment : "That the recommendation be referred back to the Committee, the Council being of opinion that, while the making of by-laws should rest with the Council, the application of certain by-laws in the several localities should be left to the discretion of the Local Authority, and that in any transfer of powers, provision should be made for this purpose." He thought that the localities should have the power of enforcing in their own districts such by-laws as they considered useful and tending to the good government of those districts. On the other hand, he could not see why the Council should impose upon the localities any by-laws which they considered unnecessary and undesirable.

After a long discussion the Council divided, and the amendment was rejected by 75 votes to 32. The Committee's recommendation was then agreed to.

The Committee recommended that the powers of the Council to declare a business to be an offensive business be not transferred to the Local Authorities. The recommendation was agreed to.

Some discussion ensued upon the next recommendation of the Committee, which was as follows :—"That the Local Authorities should be made responsible by the Legislature for inspecting and registering slaughterhouses, knackers' yards, offensive businesses, cowhouses, dairies, milkshops, and milkstores, and enforcing the by-laws or regulations made by the Council ; and that the Council should retain the power to make by-laws or regulations in respect of all these matters, and should have power to act in default of a Local Authority, as under Section 100 of the Public Health (London) Act, 1891, the necessary powers of inspection being retained for these purposes."

This was agreed to, as also were the following : That concurrent powers be vested in the Local Authorities to apply to the Local Government Board to alter the regulations of the water companies ; that the power of the Council to register and inspect all common lodging-houses, and regulate management accommodation and sanitary condition be not at present transferred to the Local Authorities ; that the Local Authorities be given concurrent powers with the Council to make representations to Railway Commissioners as to traffic facilities, stations, &c.

Result of Legal Proceedings—Formation of a Street out of King-street West, Hammersmith.—The Building Act Committee reported as follows :—

Mr. W. H. Gibbs, after having given notice to the District Surveyor, commenced the erection of residential flats, to be approached by a street leading out of King-street West, Hammersmith ; and subsequently submitted an application for the Council's consent to the formation of the street. This was refused by us, acting on behalf of the Council, on April 4 last ; the statutory reason for the refusal having been that the proposed street would not afford direct communication between two streets formed and laid out for carriage traffic. As the work of erecting the buildings was, however, continued, proceedings were taken in respect of the formation of the street without the Council's consent. At the hearing before the magistrate it was stated that, as consent had been refused, Mr. Gibbs intended to keep his land private by placing gates at the entrance of the approach to the buildings, which approach was intended solely for the use of the occupiers ; and the magistrate, after stating that the authorities as to what was a street within the meaning of section 7 of the London Building Act, 1894, were in a most unsatisfactory state, dismissed the summons on the ground that the approach to the buildings was to be kept private, but consented to state a case for the opinion of the High Court. As it is desirable that, if possible, an authoritative decision should be obtained upon the important question involved, we have directed the solicitor to take all necessary measures for getting a case stated and obtaining a decision of the High Court thereon.

The Water Supply.—Mr. Crooks moved a resolution that, in view of the existing difficulty in obtaining an adequate supply of water in a large portion of the County of London, it be an instruction to the Water Committee to forthwith submit its proposals with regard to legislation affecting the water supply in the ensuing Session of Parliament. After discussion,

Mr. Dickinson moved the adjournment of the debate, and this was carried.

The Council adjourned at half past seven o'clock.

APPLICATIONS UNDER THE 1894 LONDON BUILDING ACT.

At the meeting of the London County Council on Tuesday, the Building Act Committee brought up the following list of applications under the 1894 London Building Act. Those applications to which consent has been given are granted on certain conditions.*

Lines of Frontage.

Hampstead.—A three-story addition, &c., to a building erected at the south-western corner of Antrim-street, abutting also upon England's-lane (Mr. W. F. Cave).—Consent.

St. Pancras, North.—The erection of baths and wash-houses on the north side of Prince of Wales-road, Kentish Town, between Grafton-road and Willes-road (Mr. W. N. Blair for the Vestry of St. Pancras).—Consent.

Paddington, South.—An iron and glass conservatory upon the one-story hall at No. 5, Connaught-place, Bayswater (Mr. E. S. Prior for Mr. J. M. Scott).—Consent.

Strand.—Iron and glass covered ways at the entrances to the Café Monico, in Shaftesbury-avenue and Regent-street, St. James' (Mr. E. E. White for Messrs. G. & B. Monico).—Consent.

Strand.—An iron and glass shelter in front of Horrex's Hotel, Norfolk-street (Mr. S. Franklin for Mr. W. Horrex).—Consent.

Bethnal Green.—An oriel window in front of the new baths and wash-houses on the west side of Ramsey-street (Mr. R. S. Ayling for the Vestry of Bethnal Green).—Consent.

Dulwich.—Ten houses, with shops, on the east side of Beckenham-road, Penge, between Green-lane and Cottingham-road (Mr. H. T. Bonner for Mr. A. H. Batley).—Consent.

Finsbury, Central.—A church with a projecting tower and porch on the east side of Colney Hatch-lane, Muswell Hill, at the corner of Alexandra Park-road (Messrs. Gordon, Lowther & Gunton for the Trustees of Muswell Hill Wesleyan Church).—Consent.

Fulham.—An iron and glass shelter at the Granville Theatre of Varieties, The Broadway, Walham Green (Mr. F. Matcham for the Granville Theatre Company).—Consent.

Fulham.—One-story shops upon the forecourts of Nos. 663, 665, and 667, Fulham-road (Mr. F. W. Potter).—Consent.

Hampstead.—Buildings on the south side of Lyndhurst-road (Mr. W. A. Burr, for Mr. J. Tomblin).—Consent.

Lewisham.—Five houses, with one-story shops, on the north side of Stanstead-road, Catford, between No. 319 and Stanstead-grove (Mr. A. C. Baker, for Mr. W. A. Jewell).—Consent.

Lewisham.—Open wooden porches at Nos. 27 and 29, Garlies-road, Lordship-lane (Mr. A. Stark).—Consent.

Marylebone, West.—A three-story bay-window in front of No. 21, St. John's Wood-road (Mr. R. A. Briggs, for Colonel J. A. Temple).—Consent.

Norwood.—A block of residential flats on the east side of Upper Tulse-hill, at the corner of Wimbart-road (Mr. E. Loader for Mr. H. Loader).—Consent.

St. George, Hanover-square.—An iron and glass shelter erected at the restaurant entrance to the Berkeley Hotel, No. 77, Piccadilly (the Berkeley Hotel Company, Limited).—Consent.

Woolwich.—Bay windows to seven houses on the south side of Spray's-street, Plumstead (Messrs. Church, Quick, & Whincop for Mr. E. Kemp).—Consent.

Wandsworth.—That the application of Messrs. Gibbon & Moore for an extension of the periods within which the erection of one-story shops upon part of the forecourts of Nos. 151, 153, 155, 157, 159, 161, 163, 165, 167, and 169, Balham High-road, was required to be commenced and completed, be granted, upon condition that the shops referred to be commenced within eighteen months and completed within thirty months from February 22, 1898.—Agreed.

Kensington, South.—A block of residential flats, with projecting porches, bay windows and balconies, on the east side of Addison-road, between a roadway on the south side of The Limes, Holland Park-gardens, and No. 1, Addison-road (Mr. P. Hoffmann for Mr. E. Collins).—Refused.

Lewisham.—A three-story addition upon part of the forecourt of No. 8, Northbrook-road, Lee (Mr. H. Cottell for Miss Wood).—Refused.

Limehouse.—An oriel window, at the first floor level, in front of No. 22, Ben Jonson-road (Mr. R. Peters for Mr. H. Merceron).—Refused.

Hackney, North.—A one-story stable on the north side of Seven Sisters-road, Stoke Newington, between No. 273 and the Manor House public-house (Mr. J. W. Ransome for the North Metropolitan Tramways Company).—Refused.

Hackney, South.—A one-story shop upon part of the forecourt of No. 46, Brooksby's-walk, Homerton (Mr. J. P. Choat for Messrs Jones & Sons).—Refused.

Hackney, South.—A mission-church and club-house on a site at the junction of Chatsworth-road with Powerscroft-road, Lower Clapton (Messrs. B. Crewe & F. R. Farrow for the vicar and churchwardens of All Saint's Church).—Refused.

Battersea.—Blocks of residential flats, with projecting bays, on a site on the west side of Albert-road, to abut also upon Prince of Wales-road (Mr W. D. Goodwin for Mr. W. Goodwin).—Refused.

Battersea.—Rebuilding of the "Windsor Castle" tavern, No. 36, St. John's Hill (Messrs. F. J. Eedle & Meyers for Mr. E. J. B. Higerty).—Refused.

Finsbury, Central.—The rebuilding of the "Lord Vernon's Arms" hotel, Nos. 180 and 182, Pentonville-road, Clerkenwell (Messrs. Robb & Grierson for Mr. W. H. Scott.—Refused.

Hackney, North.—That the vestry of Hackney be informed that the Council leaves the vestry to take such proceedings as it may deem necessary with respect to a wooden structure erected upon the public way in front of No. 35, High-street, Kingsland, in advance of the general line of buildings.—Agreed.

Dulwich.—A church-room on the western side of Lordship-lane, at the corner of Dulwich Common-road (Mr. C. Barry for the vicar and churchwardens of St. Peter's church).—Consent.

Dulwich.—Twelve houses with shops, on the east side of Beckenham-road, Penge, between Cottingham-road and Kingsdale-road (Mr. H. T. Bonner for Mr. A. H. Batley).—Consent.

Greenwich.—A two-story addition with a bay window, at the rear of No. 54, Shooter's Hill-road, Blackheath, to abut upon Kidbrooke Park-road. (Mr. W. J. Hardcastle for Mr. D. Birt.)—Consent.

Kensington, South.—An inclosed porch and wooden hood in front of No. 2, Cottesmore-gardens, Victoria-road (Mr. S. R. Tatham for Mr. H. W. Simpkinson).—Consent.

Kensington, South.—A wood and glass conservatory on the roof of an open portico in front of No. 15, St. Mary Abbott's-terrace (Messrs. Weedon & Shrimpton for Mrs. Hamley).—Consent.

Kensington, South. — An iron hood over the entrance to No. 14, Holland-park-avenue (Mr. G. N. Watts for Mr. G. Pearce).—Consent.

Kensington, South.—Wood and glass inclosures to the verandah in front of No. 15, Sussex-villas (Mr. H. Hanks for Mr. S. C. Kemble).—Consent.

Lewisham.—Twelve houses, with one-story shops, on the west side of Brockley-road, between Beecroft-road and the London, Chatham, & Dover Railway (Messrs. F. & W. Abbis).—Consent.

Lewisham.—An addition to Vancouver House, Dacres-road, Sydenham, to flank upon Inglemere-road (Mr. H. W. Pratt for Mr. W. King).—Consent.

Marylebone, West.—An iron and glass covered way to the entrance to No. 4, Marlborough-place (Mr. E. H. Abbott for Mr. O. Imray).—Consent.

Peckham.—One-story shops upon part of the forecourts of Nos. 26 and 28, Rye-lane (Messrs. C. A. Richards & Co. for Mr. H. McLaren).—Consent.

St. George, Hanover-square.—Iron and glass inclosures at each end of the covered balcony at the first-floor level of No. 16, Curzon-street, Mayfair (Messrs. G. Trollope & Sons for Miss B. Wynne Roberts).—Consent.

Wandsworth.—A parish-room on the south side of Guildersfield-road, Streatham, next St. Andrew's Vicarage (Messrs. Ernest George & Yeates).—Consent.

* Names of applicants are given in brackets. Buildings are new erections unless otherwise stated.

Battersea.—Five-story bay-windows to four blocks of flats on the north side of Cambridge-road, Battersea Park (Mr. R. D. Hansom for Mr. J. R. Ward).—Refused.

Dulwich.—One-story shops upon part of the forecourts of Nos. 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, and 94, Lordship-lane (Mr. R. A. Hinds for the London and South-Western Bank, Limited, Mr. G. H. Judd, and Mr. Castle).—Refused.

Dulwich.—A one-story shop upon part of the forecourt of a house on the north side of Crebor-street, eastward of No. 4, Cyprus Villas, East Dulwich (Mr. A. E. Mullins for Mr. Gosling).—Refused.

Dulwich.—A one-story office and stable building on the south side of Grove Park, eastward of No. 25 (Mr. A. E. Mullins for Mr. J. Huckle).—Refused.

Hampstead.—An iron and glass covered way to a house known as "Lyleston," on the south side of Eton-avenue (Messrs. Dore, Hunter, & Co. for Mr. J. Welford).—Refused.

Kensington, South.—A greenhouse on part of the forecourt of No. 110, Fulham-road, to abut upon Selwood-terrace (Messrs. J. Weeks & Co., Limited, for Mr. F. Miller).—Refused.

Lewisham.—Twelve shops, with stables at the rear, on the north-east side of Springbank-road, Hither Green (Mr. A. C. Baker for Messrs. Osborne, Son, & Co.)—Refused.

Newington, West.—One-story shops upon part of the forecourts of Nos. 154, 156, 158, 160, and 162, Walworth-road (Mr. C. Trubshaw for the Midland Railway Company).—Refused.

Poplar.—A one-story shop on the forecourt of No. 89, Manchester-road, Cubitt Town (Mr. C. Brown for Mr. W. Colmer).—Refused.

Poplar.—A one-story addition in front of Brunswick Hall, Brunswick-road (Mr. R. Plumbe for the Chairman and Committee of the Poplar Hospital for Accidents).—Refused.

Southwark, West.—A sign-board in front of Nos. 68 and 70, Lant-street, Borough (Messrs. Webb & Co.)—Refused.

Strand.—Three iron balconies to the first-floor windows at the Criterion Restaurant, Piccadilly (Mr. F. T. Verity for Messrs. Spiers & Pond).—Refused.

Westminster.—Bay-windows to Block 3 of residential flats on the north-east side of Carlisle-place, at the corner of Francis-street (Messrs. Norton, Rose, Norton, & Co. for Mr. G. Martin).—Refused.

Woolwich.—A one-story addition on a portion of the forecourt of the Red Lion public-house, No. 13, Mulgrave-place (Mr. A. L. Guy for Messrs. Whitbread & Co., Limited).—Refused.

Wandsworth.—An iron and glass covered way at the entrance to the "Spread Eagle Hotel," High-street (Mr. J. W. Brooker for Mr. H. P. Stuart).—Consent.

City of London.—A two-story angle turret to No. 89, Upper Thames-street, at the corner of Allhallows-lane (Mr. A. J. Gale for the City of London Brewery Company, Limited).—Consent.

Hampstead.—A portico to No. 25, Lindfield-gardens (Messrs. Boehmer & Gibbs for Mr. E. A. Cave).—Consent.

Kensington, South.—A block of residential flats on the east side of Addison-road, next No. 1, with projecting open porticoes, five-story bay windows, and balconies (Mr. P. Hoffman for Mr. E. Collins).—Consent.

Strand.—An iron and glass shelter at the entrance to Haxell's Hotel in Exeter-street, Strand (Mr. A. B. Hayward for Mr. L. Haxell).—Consent.

St. Pancras, South.—An addition to the porch at No. 1, Upper Woburn-place (Mr. C. FitzRoy Doll for the Duke of Bedford).—Consent.

Camberwell, North.—One-story porches erected in front of two houses on the east side of Flodden-road, northward of No. 5 (Mr. E. Avern for Mr. P. Arundel).—Consent.

Dulwich.—Six houses with two-story bay windows on the site of No. 2, Lyndhurst-road and grounds (Mr. A. E. Mullins for Mr. W, Laud)—Consent.

Fulham.—That the application of Mr. F. Matcham, on behalf of Sir J. Johnson, for an extension of the period within which the erection of buildings on the sites of Nos. 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, and 41, Harwood-road, Fulham, and also on the site of stabling at the south end of that road, at the corner of Moore Park-road, was required to be commenced, be granted, upon condition that the buildings referred to be commenced within nine months from April 5, 1898.—Agreed.

Islington, North.—One-story shops upon part of the forecourts of Nos. 123 and 125, Stroud Green-road (Mr. F. L. Pither for Mr. D. F. Keer).—Consent.

Lewisham.—One-story shops upon part of the forecourt of No. 30, Dartmouth-road, Forest Hill (Messrs. Eastman Brothers).—Consent.

Paddington, North.—An iron and glass covered way on part of the forecourt of No. 2A, Blomfield-road, Maida-hill (Messrs. W. Densham & Sons for Mrs. Maitland).—Consent.

St. Pancras, East.—A theatre on the west side of High-street, Camden Town, to abut also upon Crowndale-road and Bayham-place (Mr. W. G. R. Sprague for Messrs. Marler & Saunders).—Consent.

Wandsworth.—A dwelling-house and a house with shop on the south side of Fountain-road, Lower Tooting, at the corner of Blackshaw-road (Messrs. J. Milledge & Sons for Mr. R. W. Wilcox).—Consent.

Dulwich.—That the application of Mr. J. W. Brooker for an extension of the period within which the erection of one-story additions upon part of the forecourts of the Walmer Castle tavern, and No. 100, Peckham-road, was required to be commenced, be granted, upon condition that the additions referred to be commenced within twelve months from December 21, 1897. That Mr. Brooker be informed that his application for a modification of the condition attached to the Council's consent having been considered, the Council sees no reason to depart from its decision restricting the height of the addition to 14 ft. above the footway.—Agreed.

Wandsworth.—†Twelve shops on the site of The Hawthorns and grounds, on the west side of Balham high road, with the flank of the southernmost shop to abut also upon Marius-road (Mr. F. Perks for Mr. R. Simpson).—Refused.

City of London.—A four-story oriel window at the King's Arms public house, Lower Thames-street, at the corner of Water-lane (Mr. H. M. Wakley for Reid's Brewery Company, Limited).—Refused.

Chelsea.—A three-story bay window in front of No. 4, Danvers-street, Cheyne-walk (Mr. C. R. Ashbee).—Refused.

Hackney, North.—Additions to the Finsbury-park hotel, No. 336, Green-lanes, Stoke Newington, to abut upon Woodberry-grove (Mr. E. Runtz for Mr. W. E. Manning).—Refused.

Islington, North.—A water-closet and urinal at St. John's Tavern, Junction-road, to abut upon St. John's Park (Mr. J. Taft for Mr. D. Bushill).—Refused.

Lewisham.—A three-story bay-window in front of No. 8, Northbrook-road, Lee (Mr. H. Cottell for Miss Wood).—Refused.

Marylebone, East.—An additional story upon the present two-story porch, &c., at No. 10, Sussex-place, Regent's Park (Mr. W. Whiteley for Mr. Symons).—Refused.

Rotherhithe.—A church on the west side of Southwark Park-road, Bermondsey (Mr. J. C. T. Murray, for the Building Committee of the Bermondsey Presbyterian Church).—Refused.

St. Pancras, North.—One-story shops in front of Nos. 35, 37, and 39, Lismore-road, Haverstock Hill (Mr. E. J. Strevens for Mr. W. W. Smith).—Refused.

Width of Way.

Islington, East.—Six two-story cottages, partly on the site of Nos. 4 and 5, Roads-place, Hornsey-road (Mr. R. Midworth for Mr. J. F. Spencer).—Refused.

Southwark, West.—A five-story addition, to be used as dormitories, at the rear of No. 31, Bennett-street, Stamford-street, to abut upon Bennett's-mews (Messrs. J. D. Mathews & Son for Messrs. Cook, Son, & Co.).—Refused.

Wandsworth.—A building on the site of No. 285, Balham High-road, to abut also upon Tooting Bec-road (Mr. W. W. Gwyther for the City Bank).—Refused.

Woolwich.—A temporary wood and iron hall adjoining the premises of the Church of England Soldiers' Institute, and also abutting on Wellington-street and St. John's-passage (Messrs. Humphreys, Limited, for the Institute).—Consent.

Rotherhithe.—A four-story printers' factory on the north side of Tooley-street, St. Olave, Southwark, to abut upon Unicorn-passage (Mr. G. W. Thompson for Mr. A. Couldrey).—Consent.

Kensington, South.—A one-story studio at the rear of No. 64, Bedford-gardens, to abut upon Campden-street (Mr. C. Stanley Peach for Mr. B. M. Jenkin).—Consent.

Poplar.—Eleven houses on the east side of Cottage-street (Mr. J. W. Wyles for Mr. A. Bacon).—Consent.

St. Pancras, East.—A mission building on the east side of Wakefield-street, within the prescribed distance of the centre of a mews known as Regent-buildings (Mr. T. Arnold for the trustees of the English Presbyterian Church, Regent's-square).—Consent.

Hackney, Central.—A warehouse on the site of Nos. 1, 2, 3, and 4, Grove-cottages, Grove-lane (Mr. J. Hamilton for Mrs. Siegenberg).—Refused.

Lambeth, North.—A warehouse on the south side of Sapphire-place (Messrs. J. Lapthorne & Company for Messrs. Atkinson & Company).—Refused.

Lewisham.—An addition to the Forest-hill Brewery Company's premises at less than the prescribed distance from the centre of Church-vale-road, Fosest-hill (Mr. W. Bradford for the company).—Refused.

Stepney.—A four-story building, with shops on the ground floor, upon part of the forecourt of Lycett Chapel, Mile-end-road, to abut also upon White-horse-lane, at less than the prescribed distance from the centre of the road (Mr. J. F. Parker for the Rev. P. Thompson).—Refused.

Islington, East.—Six two-story buildings on the south side of Road's-place, Hornsey-road, partly on the site of Nos. 4 and 5 (Mr. R. Midworth for Mr. J. F. Spencer).—Consent.

Greenwich.†—A one-story building on the west side of Bishops'-buildings, Thames-street (Messrs. G. F. Harvey & Co.)—Consent.

Limehouse.—That the application of Messrs. E. N. Clifton, Son, & Hope for an extension of the periods within which the erection of a one-story building to abut upon Wapping Dock-street and Cinnamon-street respectively, was required to be commenced and completed, be granted.—Agreed.

Woolwich.—An addition to the Woolwich Theatre, at less than the prescribed distance from the centre of Rope-yard-rails (Mr. F. Matcham for Mr. S. Barnard).—Refused.

Deptford.†—A four-story mineral water factory on the east side of Church-street, Deptford, to abut also upon Creek-street (Mr. G. Banks).—Refused.

Rotherhithe.—A grain-pit erected at Trinity Wharf, Rotherhithe-street, at less than the prescribed distance from the centre of the road (The British Drying Company, Limited).—Refused.

Poplar.†—A one-story warehouse at Ferguson's Wharf, West Ferry-road, to abut upon a public footway leading to Millwall Pier (Mr. J. Hollway).—Refused.

Cubical Extent.

City of London.—The erection on the west side of Moorfields, between Tenter-street and White-street, of a building to exceed in extent 250,000 cubic feet, and to be used only for the purposes of the trade of a fine art and book publisher (Messrs. Raphael Tuck & Son Limited).—Refused.

Buildings for the Supply of Electricity.

Hampstead.—That the Council do approve of the the plans, dated July 19, 1898, submitted with the application of Mr. J. Hudson, for the Vestry of Hampstead, for the construction of an addition to the offices at the generating station and works at Lithos-road.—Agreed.

Buildings on Low-lying Land.—Part XI.

Woolwich.—That the solicitor do prepare a licence under Section 122 of the London Building Act, 1894, to Mr. T. J. Young, for the erection of five dwelling houses on low-lying land situated on the north side of Bostal-lane, Abbey Wood, Plumstead (for Mr. J. Bailey).—Agreed.

Recommendations marked † are contrary to the views of the Local Authority.

[We are compelled, for want of space, to hold over other applications until next week.]

COMPETITIONS.

Constabulary Offices, Warrington.—The Watch Committee have given their awards in this competition as follows:—First premium, Mr. R. Burns Dick, 55, Northumberland-street, Newcastle-on-Tyne; second, Messrs. Tapper & Crouch, Gray's Inn-buildings, Gray's Inn, London, W.C.; third, Mr. J. Lane Fox, Bond-street, Dewsbury. Mr. R. I. Bennett, F.R.I.B.A., of Cooper-street, Manchester, was appointed by the Corporation as assessor, on the recommendation of the Royal Institute of British Architects.

ENGINEERING SOCIETIES.

Society of Engineers.—At the meeting on Monday, the 3rd inst., Mr. W. Worby Beaumont, President, in the chair, a paper was read by Mr. Sherard Cowper-Coles on "Protective Metallic Coatings for Iron and Steel." The author commenced by pointing out the comparative corrodibility of iron and steel under varying conditions, and the importance of the subject now that steel, which corrodes more rapidly than iron, is so largely used for structural purposes and for building light craft, such as torpedo boats. He then gave some interesting examples of cases where failures had occurred in engineering structures owing to the rapid corrosion of iron and steel. He then stated that up to the present zinc had been found to be the most effective coating which was due to the electro-chemical action set up between the steel and zinc. The author also explained that the electro-chemical action set up between two different metals made it necessary to carefully insulate copper sheathing from the steel hulls of ships, and rendered the direct application of copper valueless as a protective coating to iron and steel. A short history of the galvanising industry was then briefly given, together with details of the improvements that have been introduced from time to time. A comparison was drawn between hot and cold galvanising, and the results obtained when tested by the Post Office test for determining the thickness of zinc coatings. The method of cold galvanising was then fully described, and the methods of preparing iron surfaces for receiving the coating of zinc. A description was also given of some improvements in the acid treatment and sand blasting for the removal of mill scale preparatory to zincing. The process of sand blasting was fully described. The sand blast apparatus consists of an air-chamber and hopper into which the air is forced at a pressure of about 5 lbs., and projected through a soft rubber-tube fitted with a steel nozzle. It was stated that the harder the surface the more vigorously the small

particles of sand or shot attacked it. Amongst the most useful applications of this process is that of sharpening files and frosting glass. The question next dealt with was the cost and output of various galvanising plants, and a description was given of a special apparatus for the treatment of wires and tubes. Some details were given of an American process which has lately been tried with some success for the more economical galvanising of wires. In this process coils or bundles of wire are dipped in a bath of molten zinc, and are then placed in a centrifugal machine to remove the excess of metal. The vexed question of what the formation of zinc sponge is due to was discussed, and the results of some recent investigations were given. The author finally explained the best working conditions for electro-zincing, and gave a comparison of the actual and theoretical weight of zinc obtained for a given amount of electrical energy. In conclusion attention was drawn to cadmium and copper as protective coatings for iron and steel, and their advantages and disadvantages compared with those of zinc were stated.

The Institution of Junior Engineers.—On the 24th ult. a party of about one hundred members of this society availed themselves of the opportunity kindly afforded by Sir David Salomons, Bart., to inspect his engineering workshops, laboratories, lecture theatre, &c., at Broomhill, Tunbridge Wells. At the conclusion Mr. H. B. Vorley, the Chairman, expressed the cordial acknowledgments of the Institution. Sir W. H. White, F.R.S., is to deliver his presidential address on Friday, October 21.

BOOKS RECEIVED.

House Drainage; its Inspection and Testing. By Richard J. Jenkins. (The St. Bride's Press.)

Carpentry and Joinery. By Frederick C. Webber. (Methuen & Co.)

Correspondence.

To the Editor of The Builder.

NATIONAL SOCIETY FOR CHECKING THE ABUSES OF PUBLIC ADVERTISING.

Sir,—It is proposed at an early date to present to the London County Council the memorial in which attention is drawn to the need of municipal control over all forms of spectacular advertising, with special reference to recent developments of the practice.

The memorial is to be signed exclusively by London architects, and already about 350 signatures have been received. Will you permit me through your columns to remind those architects who have postponed their reply to our circular that if they desire to help us in the matter they ought, without delay, to return the draft duly signed?

Richardson Evans, Hon. Sec.

1, Camp View,
Wimbledon, Surrey.

THE SCARCITY OF WATER.

Sir,—Every year we get more severe warnings of the increasing difficulty of supplying large towns with water, and of the danger from prolonged drought, and yet, in the face of these difficulties, we make very little effort to economise the supply we already have, and which in tropical climates would often be considered ample. Take London, for instance. The area of London is roughly speaking about 100 square miles, or 64,000 acres. One inch of rain represents about 100 tons of water to the acre, or 6,400,000 tons in London alone. The average yearly rainfall in ordinary weather is over 20 in.; so in an average year the rainfall in London is over 128,000,000 tons, and there are 224 gallons to a ton. Practically the whole of this enormous quantity of water is allowed to go direct into the sewers, and has to be purified before being discharged into the rivers. Surely this waste should be stopped. The impurities in rain water are easily filtered out, and it is much better for washing purposes in every way than hard water. If used by every house, it would help to relieve the enormous strain on the water companies, and would leave a larger reserve in the springs and wells for times of drought, and would also take part of the storm water which overloads the sewers. The great number of baths now fitted to houses flush the drains fairly well twice a day, so that the storm water from the streets alone would be quite sufficient for that purpose. In country places, which are also in some cases now feeling the want of water, it would be a good thing to have earth closets fitted, which could be used in times of drought or frost, and so remove the necessity of sending large quantities of clean water down the drains.

Guy M. Nicholson.

FITTINGS NOT IN ACCORDANCE WITH CONTRACT.

Sir,—By the enclosed cutting from the *Daily Chronicle* you will learn that a Birmingham bicycle builder undertook to build a bicycle with certain specified fittings, whereas he delivered the bicycle with most of the fittings otherwise than as contracted for. The company whose fittings were specified (not the customer for whom the bicycle was built) prosecuted the bicycle maker for an infringement of the Merchandise Trades Marks Acts. The maker's counsel admitted the offence and said his client had acted carelessly, but had no intention to commit a fraud. The magistrate convicted the bicycle builder, and ordered him to pay 40s. and 2 guineas costs.

It would be interesting to your readers to know whether the builder of a house who had entered into a contract to fit it with certain fittings, but put other fittings not of the exact kind required by his contract, would be similarly liable to prosecution either at the instance of the building owner with whom he had contracted, or at the instance of the person whose proprietary articles were specified: and if not, why not? There may be this distinction, that the Acts above mentioned apply only to "chattels," and that the fittings of a house when fixed would be realty. Architect.

*** It is hazardous even for lawyers to give opinions on Acts of Parliament, which become more conundrum-like every day, unless they have been carefully argued. But we should say that the Merchandise Marks Act was not intended to apply to the latter case suggested by our correspondent.—Ed.

AN OLD LONDON MAUSOLEUM.

Sir,—Adverting to the letter you printed on August 27 I may refer your correspondent to the family memoirs of the Rev. Wm. Stukeley, edited, 1882-7, by the Rev. W. L. Lukis for the Surtees Society, Durham. Vol. I., p. 6, and Vol. III. pp. 18-21, contain extracts from Stukeley's copious diary, thus:—

1759, April 20, I agreed . . . . for Mr. Hogin's house, garden, and pasture, at Kentish Town. . . . .

[1761] After nine years assiduous enquiry I found a most agreeable rural retreat at Kentish Town, two miles and a half distant. . . . the hither end of the village, between the castle inn and the chapel, an half-hour's walk over sweet fields. . . . The house is new built for the most part. . . . In the year 1760 I bought the whole estate, a lease from St. Bartholomew's Hospital, for 600*l*. . . . I built a new bed chamber to the south. . . . I inclosed two acres of medow out of the great pasture, . . . made a retired place like a hermitage, a kitchen garden, &c. . . . .

On June 4, 1764, put up Sir Nicholas de Stukeley's monumental brass effigies in the chapel of my mausoleum at Kentish Town.

The diary, in many volumes, and a mass of cognate MSS. were once owned by John Britton; they belonged, *circa* 1882, to the Rev. H. F. St. John, of Dinmore House, near Leominster. D. M.

The Student's Column.

SOUND, LIGHT, AND HEAT.—XV.

SOUND: THE ISACOUSTIC CURVE.

In the last article we referred to Scott Russell's isacoustic curve. The principle embodied in this is particularly brought into play in the mode of setting out the seats in any large building so as to secure that each occupant of a seat shall have direct uninterrupted hearing and sight. Professor Roger Smith refers to this mode of setting out as follows:—The seats must be ranged not as tangents to a straight line, but on a concave curve to be set out in the following manner:—The position and height of the speaker and of the auditors occupying the first seat being determined, a line is to be drawn from the speaker's mouth touching the point where the top of the first auditor's head would come, and at the proper distance, say, for example, at 2 ft. 6 in. back, the situation of the seat for the second auditor is to be marked, and on the line indicating the back of it a height of 1 ft. 6 in. or less is to be set off upwards from the point where the ray from the speaker's mouth touched; this is to mark the position of the top of the head of the second auditor. By repeating this process, setting up 18 in. at each seat, a series of points are found all ranged in a curve, and this is the "isacoustic" curve of Mr. Scott Russell. Each seat will be placed about 2 ft. 9 in. below the mark indicating the top of the head of its occupant, and the floor on which each stands should be about 1 ft. 6 in. lower than that. Professor Smith observes that these dimensions, especially the 1 ft. 6 in. for face room, are in excess of what will suffice where space has to be rigidly economised.*

Lachéz proposes the following dimensions to fulfil these requirements:—

	ft. in.	ft. in.
Back to back of seats...	1 11½	to 2 5½
Height of seat	1 5¾	
Seats to top of head ...	2 11½	to 3 6
Face room	6	to 1 0

The isacoustic curve when the auditory is a good deal below the speaker has the property of dipping down slightly at its commencement, and under such circumstances a flat floor might be substituted without serious disadvantage for part of the curve. The degree of steepness requisite will vary with circumstances, such as, for instance, whether it is essential for the auditors to look down on a table or merely to look up at a speaker, and the more space that can be allowed for each seat, from front to back, the less inclination will be requisite (Smith). This principle is exemplified in the lecture theatre of the Royal Institution; and speaking of that room, from a practical standpoint it is not successful throughout. Anybody who has had the misfortune to be located on one of the top seats will remember the irresistible tendency to bend the head forwards, and the tiring operation of looking into the depths beneath for upwards of an hour. The majority of the lectures are illustrated by experiments, which must be seen for the lectures to be fully comprehended.

Even for lecture theatres, where it is desirable to get each auditor as near to the lecture table as possible we are not sure, but that the low ceiling is not the better form. If the floor is so arranged as to slope upwards from the lecturer and the seats to curve round, each low tier being so arranged that all the auditors upon it shall be practically equidistant from him, that would seem to be the most convenient method of arrangement. The majority of people who have had much experience as auditors in small lecture theatres, both of the high and the low type, will probably agree that though there might be a slight loss of sound in the back seats of the last mentioned type, that the experiments could be better seen than if the latter had to be looked down upon in the distance, as in the case of the former type of room. Again, from the lecturer's point of view it may be confidently asserted that many men prefer to speak outwards rather than both upwards and downwards. As a matter of fact, in reference to theatres having a deep well, the auditors in the upper seats rarely catch a glimpse of the speaker's face unless the speaker is accustomed to the place. The principle of the isacoustic curve can, therefore, be better applied in practice to very large theatres, where many of the disabilities mentioned could not appertan. Indeed, one of the earliest applications of the principle is on the large scale, for, approximately, the Romans employed the isacoustic curve in the amphitheatre at Nismes.

The special object of keeping ceilings moderately low is to prevent the loss of sound upwards, though the nature of the lining of a lofty ceiling can in many instances modify effects. Moderately low ceilings must always run *pari passu* with the good proportion of the whole of the interior. In the House of Commons it was found that the ceiling was too lofty; it was lowered, the angles were canted off, and the ceiling formed of wood, which arrangement materially improved its acoustic properties. Similar examples might be quoted in reference to other buildings.

REFRACTION OF SOUND AND LIGHT.

Hajech has shown that the laws of the refraction of sound are the same as for those of light and heat. Atkinson observes that refraction of light is the deflection or bending which the rays of light experience in passing obliquely from one medium to another—for instance, from air into water. If the incident ray is perpendicular to the surface separating the two media it is not bent, but continues its course in a right line. All the light which falls on a refracting surface does not completely pass into it; one part is reflected and scattered, whilst another penetrates into the medium. In uncrystallised media, such as air, liquids, ordinary glass, the luminous ray is singly refracted; but in certain crystallised bodies, such

* Roger Smith, "Acoustics" *Op. cit.* p. 44.

as Iceland spar, selenite, &c, the incident ray gives rise to two refracted rays. The latter phenomenon is called double refraction.

Dealing only with single refraction, in which we are more particularly interested, so far as sound is concerned, it may be stated that when a luminous ray is refracted in passing from one medium into another of a different refractive power, the following laws (known as Descartes' laws) apply :—

(*a*) Whatever the obliquity of the incident ray, the ratio which the sine of the incident angle bears to the sine of the angle of refraction is constant for the same two media, but varies with different media.

(*b*) The incident and the refracted ray are in the same plane, which is perpendicular to the surface separating the two media.

The ratio between the sines of the incident and refracted angle is known as the index of refraction.

With reference to sound, in Hajech's experiments he used tubes filled with various gases and liquids, and closed by membranes; the membrane at one end was at right angles to the axis of the tube, while the other made an angle with it. Ganot,* speaking of this method, states that when these tubes were placed in an aperture in the wall between two rooms a sound produced in front of the tube in one room (that of a tuning-fork, for instance) was heard in directions in the other varying with the inclination of the second membrane, and with the nature of the substance with which the tube was filled. Accurate measurements showed that the law held that the sines of the angle of incidence and of refraction are in a constant ratio, and that this ratio is equal to that of the velocity of sound in the two media. Thus the velocity of sound in water is not very different from that in hydrogen, and the deviations produced are nearly equal.

Sound waves are known to be analagous to those of light and heat, so far as refraction is concerned, in many other ways. Sondhauss constructed lenses of gas by cutting equal segments out of a large collodion balloon, and fastening them on the two sides of a sheet-iron ring a foot in diameter, so as to form a double convex lens about 4 in. thick in the centre. Atkinson, in "Ganot," states that this was filled with carbonic acid, and a watch was placed in the direction of the axis; the point was then sought for on the other side of the lens at which the sound was most distinctly heard. It was found that when the ear was removed from the axis, the sound was scarcely perceptible, but that at a certain poiut on the axial line it was very distinctly heard. Consequently the sound waves in passing from the lens had converged towards the axis; their direction had been changed—they had been refracted.

Another instance of the refraction of sound is detailed by Atkinson (*Op. cit.* p. 221), which has been known to scientists for a long time. As we have before seen, sound is propagated in a direction against that of the wind with less velocity than with the wind. This is probably due to refraction on a large scale. The velocity of wind along the ground is always considerably less than at a greater height; hence the front of a condensed wave which was originally vertical becomes tilted upwards and with the lower part forward; and as the direction of the wave-motion is at right angles to the front of the wave, the effect of the coalescence of a number of rays, thus directed upwards, is to produce an increase of the sound in the higher regions. The rays which travel with the wind will, for similar reasons, be refracted downwards, and thus the sound is heard better.

From the practical standpoint the principles of refraction are immediately connected with the various media through which sound passes, and particularly in the atmosphere. This has been foreshadowed to some extent in our observations on temperature and pressure of the air as applied to acoustics, but, as the student will have noticed, the refraction of sound is also to a large extent bound up in reflection. Refraction and deflection of sound rays can only come into noticeable operation in the interior of very large halls and theatres, and many of the effects produced by the phenomenon have hitherto been commonly ascribed to reflection, the state of the air in rooms not having been sufficiently taken into consideration.

SOUND : CONCLUSION.

The acoustic properties of a public building, or theatre, may be considerably modified by means of drapery, or by the character of its furniture. Experiments in this direction have been carried out, principally, when the building was empty—which is a mistake. The difficulty of satisfactorily dealing with the matter whilst a crowded audience is in attendance will be immediately recognised; on the other hand, the latter act as modifiers of sound in the building, and ought to be reckoned with. It is common knowledge with many interiors that whilst echo is very noticeable in them when comparatively empty, there is considerable improvement when they are full, and it is in the latter condition that they should be most fully considered. The echo in many an interior has been practically done away with by lining the walls with more or less pervious plastering, and in smaller buildings by the judicious hanging of curtains. More than once it has been remarked that, with reference to churches, the echo has been much less when the floors of the aisles have been carpeted than when they were bare and their stone slabs encouraged reflection.

The parabolic reflector has not, perhaps, had its day for all purposes of reinforcement; and the sounding board bids fair to create more attention than it has done in the past. The floors of the stage or platform will, unless we are mistaken, be more frequently constructed on the principles of the sounding-board, and it will not be long ere resonant chambers will be made, both in shape and in other particulars, more with reference to the shape and size of the hall or theatre in which they are to be placed. Still, there is yet a very great deal to be learned in the actual methods of construction of interiors when these latter are, primarily, to be made subservient to the known laws of acoustics. The practical man and the theorist must become better acquainted with each other.

* *Op. cit.* 1893, p. 220.

GENERAL BUILDING NEWS.

RESTORATION OF ST. MARY'S CHAPEL, ABERDEEN.—St. Mary's Chapel is the only ancient example of ecclesiastical stone vaulting in Aberdeenshire, and its restoration has been proceeding during the last five or six years. In 1893 the restoration movement was formally started. A public-spirited offer by Mr. G. G. Jenkins, Mr. William Kelly, and Mr. A. Marshall Mackenzie, A.R.S.A., architects, Aberdeen, to give their services as an Architectural Committee free of charge was accepted, and practical steps were taken for carrying out the work. The chapel consists of three portions—the nave (ending towards the east in an octagonal apse) and the north and south transepts. The first thing done was to take out the carved oak seating and other woodwork of the chapel. This included the timber flooring. Then the thick coats of plaster were cleaned off the walls and the vaulted ceiling, revealing the fine stone vaulting, with its moulded ribs rising from quaintly-carved stone corbels, and marked at the intersection by equally interesting bosses. The stripping of the lath and plaster from the west walls displayed some fine rib-vaulting which adds two new spandrels to the roof. In this west wall, too, were discovered—one in the south transept and the other in the north—two old staircases which formerly led up to the choir of old St. Nicholas Church. These interesting old relics have been laid fully bare. Prior to the restoration the floor of the chapel was all on one level, including the south transept, which served as the vestry of the East Church. In its original state, however, the floors of the north and south transepts were at a higher level than the floor of the nave, and this order of things has been reverted to. The floor of the nave has been slightly lowered and the floor of the transepts slightly raised, so that there is now 2 ft. of difference in the level, and a broad flight of four steps rises from the floor of the nave, as in ancient days, to the transepts on either side. The floor-level of the apse has also been slightly raised. Much careful labour has been spent on the vaulted ceiling. On the removal of the plaster, the stone vaulting was seen to be in a dilapidated state in many places, so that new stones had to be inserted. This had to be done from the botom upward. Perhaps the most delicate work, and that which now shows the best results, was the restoration of the four massive piers which are the main supports of the roof. The bases of the piers were very much destroyed, but new blocks have been inserted. The floor of the transepts, as well as the nave, has been laid with granite. The ancient carved woodwork which, prior to the restoration, formed the benches, desks, &c., of St. Mary's Chapel, has been carefully preserved. Part of it has been utilised to form an oaken dado round the chapel. A certain portion has been used to form a high "wall-back" to the pulpit-seat at the west end of the nave. The wall-back is surmounted by a carved oak canopy over the long oaken seat. Still another portion of the carved woodwork has been used to form the front of the long pulpit-desk. On the raised floor in the apse is a pink granite communion table. In the north transept is the octagon font of granite. The windows of the chapel have had special attention in connexion with the restoration. There are three windows of three lights each in the apse, and one window of two lights in each of the transepts. The mullions of these have all been renewed, and other minor improvements effected, and as soon as the work can be carried through, the windows will be filled with stained glass. The chapel will be lighted with the electric light and seated with chairs.—*Aberdeen Free Press.*

PROPOSED RESTORATION OF ST. GEORGE'S CHURCH, LEEDS.—A scheme for the restoration and general improvement of St. George's Church, Leeds, is being promoted by the vicar and others. In their statement of the requirements of the case the vicar and officers of the church say :—"The roof of the church is in bad condition, and it is absolutely necessary that serious structural repairs be undertaken at an early date. Besides this, the interior is very dark and dirty, and badly ventilated; the pews are high and straight-backed, and, to many, uncomfortable; there is no light whatever at the east end of the choir, and there is an absence of proper vestry accommodation for the clergy and choir." The committee have drawn up a scheme which comprises (1) the thorough cleaning, painting, and decoration of the interior of the church; (2) a new roof; (3) new pews for the body of the church; (4) electric lighting; (5) the construction of an apse at the east end; (6) more commodious vestry accommodation; (7) the re-arrangement of the heating apparatus. The cost of the scheme will be 5,000*l.* The architect is Mr. H. Walker, of Leeds.

RESTORATION OF STEEPLE, GREAT MARLOW PARISH CHURCH.—It is proposed to restore the spire and pinnacles of this church, and to repair the stone work of the tower. Mr. John Oldrid Scott is the architect.

REOPENING OF BRETHERTON CHURCH, LANCASHIRE.—Bretherton Church has just been renovated and reopened. The architects were Messrs. Austin & Paley, of Lancaster.

ST. AMBROSE CHURCH, EDGBASTON, BIRMINGHAM.—The new Church of St. Mary and St. Ambrose, Edgbaston, was consecrated on the 28th ult. by the Bishop of Worcester. It is Gothic in style, and is erected on a site, given by Lord Calthorpe, at the corner of Pershore-road and Raglan-road. The edifice, which provides seating accommodation for over 700 worshippers, is built of red brick, with terra cotta dressings upon the outside, and bath stone dressings in the interior. It consists of a nave 90 ft. long, with a chancel 36 ft. long, north and south aisles, shallow north and south transepts, a choir vestry, with organ over, an apsidal projection at the west end forming a baptistry, and a south porch. A tower and spire, 150 ft. in height, are in course of construction at the north-west corner, and are expected to be completed, together with a peal of tubular bells, by next Easter. The floor of the body of the church is wood, the aisles being paved. The cost, exclusive of fittings, will be 8,000*l.* The gifts include a carved pulpit, in Caen stone (the work of Messrs. Bridgeman, of Lichfield). The organ is by Messrs. J. W. Walker & Sons, of London, and the east window by Messrs. Hardman & Powell, the subject of which is the "Te Deum." The architect of the church is Mr. J. A. Chatwin, and the work of building is carried out under the superintendence of Mr. G. Day, by Messrs. Collins & Godfrey, Tewkesbury.

INDEPENDENT CHURCH, BUXTON, DERBYSHIRE.—A new vestry has been erected in connexion with the Independent Church at Buxton. The builder was Mr. Bagshaw, and the architect was Mr. Holland.

U.P. CHURCH HALL, SOUTH LANGSIDE, GLASGOW.— The memorial stone has just been laid of the Church Hall in connexion with the new U.P. Church to be formed at Newlands, South Langside. The hall is situated to the south-west of the new Millbrae Bridge over the Cart, near Langside Railway Station. The style of the hall is Gothic, the plans being by Messrs. Stark, Malcolm, & Rowntree, Glasgow. It is capable of seating 350 persons, and will cost about 1,450*l.* The mason work is being executed by Mr. Alexander Stewart, and the woodwork by Mr. W. Cowan.

UNION CHURCH, BEESTON. — The foundation stone has been laid of a church for the Baptist and Congregational bodies at Beeston. In addition to the main building, there will be the usual accommodation in the shape of class and school rooms. The architect is Mr. C. N. Holloway, of Nottingham, and the building contract has been given to Mr. William Turner, of Beeston.

NEW STABLES AND CULVERT, PERTH.—The new stables at Perth Harbour, belonging to the Police Commissioners, which have been erected in connexion with the new manure depôt at the Friarton, and the new culvert into which the water from Craigie Burn has been diverted, were opened recently. The stables consist of sixteen stalls, with bothy, store, and boiler-house on the ground floor, with double shed, giving accommodation for twenty carts, two loose boxes, &c. The buildings are about 145 ft. long. The contractors were :—Mason and brickwork, Messrs. Fraser & Morton; joiners, Messrs. Watson & Crichton; plumbers, Messrs. J. & P. Murray; slater, Mr. James Buchan; plasterer, Mr. John Peebles; ironwork, Mr. William Hume;

painter work, Mr. George Muirhead. The cost was 2,500*l.* The culvert, which is of brickwork, is about 520 ft. long, and is an arched sewer 8 ft. broad by 4 ft. 6 in. high, and cost 1,500*l.* It was constructed by Mr. Peter Gerrity. Both the stables and the culvert were designed by and constructed under the personal supervision of Mr. Robert M'Killop, Burgh Surveyor.

DRILL-HALL, ORMSKIRK.—The tender of Mr. William Fyles, builder, of Ormskirk, for the erection of a new drill-hall for the Ormskirk companies of the 3rd V.B.K.L.R. has been accepted. The architect is Mr. H. Rimmer, of Ormskirk.

ALTERATIONS, ALBERT HALL, SWANSEA.—Messrs. Bennett Bros., of Swansea, are engaged in carrying out alterations at the Albert Hall, Swansea. The plans were prepared by Messrs. Wilson & Moxham. The alterations entail the enlargement of the cloak-room, the erection of underground lavatories, &c., and a gallery in the minor hall.

NEW WING, EXETER MUSEUM.—An addition is now being made to the Albert Memorial Museum at Exeter, in commemoration of the Queen's Diamond Jubilee. The new wing is to be known as the "Exeter Technical and University Extension College." The new buildings will be mainly at the rear of the Museum, with a frontage of about 24 ft. towards Upper Paul-street. This front, three istories high, will be built of Pocombe stone with Ham Hill dressing, in harmony with the adjoining additions to the Museum, erected a few years ago. It will be of an Italian Gothic character. The wing will contain five large class-rooms, a physical laboratory, students' reading-room, cast-room, with staff and apparatus rooms, lavatories, and offices. These will all be fitted with electric light and heated by hot water. The buildings have been designed by Messrs. Tait & Harvey, of Exeter; and the contractors are Messrs. Ham & Passmore.

DRILL-HALL, CHESTERFIELD.—On the 28th ult. Lord Roberts opened a Drill-hall at Chesterfield, which the town has erected for the use of the local Volunteers, as a memorial of the Diamond Jubilee of her Majesty. The hall is situated on Ashgate-road. The elevations are of red brick, relieved with stone dressings, and there is a frontage to the main road of 165 ft. The entrance consists of a vestibule 12 ft. square, in which are placed steps leading to the hall. This entrance has front and flanking buttresses of brickwork, relieved with stone, the upper portion being carved. The main front is set back some distance from the road, and enclosed with ornamental iron railings. On the main roof, in the centre, is a turret, which is used as a means of ventilating the hall. The interior forms one large hall, 150 ft. long by 55 ft. wide. The roof is of steel, covered with match boarding, stained and varnished. At the east end of the building are the officers' quarters of the Derbyshire Regiment, also the principal offices of the headquarters. At the west end of the hall is a band gallery. In the basement is a store-room. Mr. C. Jackson, of Chesterfield, is the architect, and Mr. John Wright, of Chesterfield, obtained the contract, the sub-contractors being all local men.

CABOT TOWER, BRANDON HILL, BRISTOL.—The Marquis of Dufferin and Ava recently opened this tower, which has been erected in memory of the discovery in 1497 of North America by John Cabot and a crew of Bristol sailors. The tower, which has been erected in the centre of the platform upon which the guns captured in the Crimean War stood, is a square structure of ornamental character. It has buttresses at the angles from base to summit. There are two stages, each of which is relieved with an ornamental balcony. The floor of the upper balcony is 75 ft. from the base, and above this there is an octagonal spire of 35 ft. The tower is ascended by means of a circular staircase to the first stage, and above that there is a spiral staircase to the second stage. The architect was Mr. W. V. Gough. The spire of freestone is surmounted by a gilded figure mounted on a globe, also gilded. The platform on which the tower is erected is square and is 42 ft. across. The tower is 364 ft. above sea level.

THE WHITWORTH HALL AT OWENS COLLEGE, MANCHESTER.—Contracts have been entered into for the superstructure of the Whitworth Hall at Owens College, the foundations of which have been completed. Messrs. William Southern & Sons, of Salford, have succeeded in obtaining the contract, and the cost is believed to be about 46,000*l.* The erection of the building will occupy about three years. The building will adjoin the present museum of the college in Oxford-street, close to the Christie Library. The main entrance is to be in Oxford-street, and there will also be an entrance in Burlington-street. The building is from the design of Mr. Alfred Waterhouse, the original architect of the college buildings.

HOME, ANCOATS.—On the 26th ult. the memorial stone was laid of the New St. Vincent's Home, in St. Vincent's-street, Ancoats, which is to be provided by the Sisters of Charity of St. Vincent de Paul. It is for the purpose of a night refuge for destitute girls, and also for training girls for work outside the home. The architect is Mr. A. Hill.

NEW PREMISES, HUCKNALL TORKARD INDUSTRIAL PROVIDENT SOCIETY.—New premises for the Hucknall Torkard Industrial Provident Society have just been opened. The structure has been erected from plans prepared by Mr. A. N. Bromley, architect, of Nottingham. The premises comprise four shops, and include a tailoring department on the basement and a workroom on the first-floor, a drapery department with show-room, a shop for millinery, combining a small office, a provision establishment, all on the ground floor, whilst on the first floor is located the general offices of the society, the board-room, and secretary's apartments, with strong-room for deeds and other conveniences. On the second floor a hall, provided with suitable entrances and exits at either end, and capable of accommodating 450 persons, has been built. The total cost is estimated at about 6,000*l.* Mr. Joseph A. Munks was the contractor.

PROPOSED NEW TOWN HALL FOR SCARBOROUGH.—Colonel C. H. Luard, R.E., held an inquiry in the Town Hall, Scarborough, on the 26th ult., on behalf of the Local Government Board, with respect to an application by the Corporation for power to borrow 33,575*l.* for the purchase of the St. Nicholas House Estate. The Corporation are acquiring the property with the view of using the mansion-house for public offices, and converting the gardens into pleasure grounds for the use of the public. The Corporation also asked the sanction of the Board to the sale of four acres of land in Seamer-lane required by the North-Eastern Railway Company for additional siding accommodation. With reference to the St. Nicholas House Estate, Mr. H. W. Smith (Borough Engineer) produced the plans of a suggested scheme for dealing with the existing mansion-house. The outer walls of the building, he explained, would be preserved. Inside there would be a rearrangement of rooms. A council chamber would be provided, as well as rooms for the use of the Councillors, and in addition accommodation would be provided for various municipal offices, which at present were scattered about the borough. In reply to the Inspector, the Town Clerk stated that the existing Town Hall in Castle-road would probably be disposed of; but that was not yet settled. Then St. Nicholas House would become the Town Hall. The Corporation wished to secure the gardens for the use of the public, in which case they would be saved from the hands of the speculative builder.

SCHOOL, HOVE.—The first of the three blocks which are to constitute the new schools erected in Portland-road by the Hove and Aldrington School Board was opened on the 26th ult. Messrs. Clayton & Black are the architects, and Messrs. Jay are the contractors.

CHURCH SCHOOLS, MILES PLATTING.—The memorial stones of the extensions to St. Mark's Church Schools, Holland-street, Miles Platting, are shortly to be laid. The architects are Messrs. Potts, Son, & Pickup, of Manchester. The new infant school will be a one-story building, and will consist of a central hall, 39 ft. by 31 ft., and four class-rooms opening out of it. Externally the building will be ornamented by red pressed bricks with terra-cotta dressings, and internally the rooms will be brightened by glazed brick dados. The builders are Messrs. A. R. Bullivant & Sons.

HOTEL, SOUTHWOLD.—At the adjourned general annual licensing meeting for the borough of Southwold recently, before Messrs. Charles Foster (Chairman), Mayhew, and Edwards, Mr. H Spence, managing director of the Coast Development Co., Limited, applied for a provisional grant of a licence for a proposed new hotel.—Mr. E. Reeve appeared for the applicant, and stated that the hotel would be erected on a site commanding a fine sea view, and forming portion of the land recently purchased by the company. This land would shortly be developed for building purposes, and as the company intended in the coming Parliamentary session to apply for a provisional order to erect a pier at which steamers could stop, it was anticipated in the near future that the increase of visitors would be great. At the present time there was need of further first-class hotel accommodation. Mr. Reeve proceeded to explain the plans which had been prepared by Mr. C. H. M. Mileham, of Lincoln's Inn-fields, architect. The ground-floor plan provided for a coffee-room 50 ft. by 33 ft., a lounge 36 ft. by 24 ft., reading, smoking, billiard, and bicycle rooms, with manager's-room and offices. The basement would contain kitchen and offices, with sleeping-rooms for men servants and visitors' servants. On the first floor there will be drawing-room 36 ft. by 19 ft., while upwards of forty bedrooms would be provided for guests. The plans were to be drawn so as to provide for an extension giving sixty more bedrooms, and the total cost, with the extension, would amount to 20,000*l.*—The Chairman announced that the application would be granted.

STEAM LAUNDRY, CARDIFF.—A new steam laundry was recently opened in the Marlborough-road, Roath. Its erection has cost 6,000*l.* The ground on which the laundry has been erected forms part of the Tredegar Estate. Messrs. Habershon & Fawckner, were the architects. Messrs. W. Thomas & Co., of Cardiff, secured the contract for the building, while the whole of the plant has been supplied by Messrs. Bradford & Co. The actual building is some 130 ft. long by 60 ft. wide. The front is faced with white marble, and is designed in the Renaissance style.

EXTENSION OF THE ROYAL ALBERT ASYLUM, LANCASTER.—The foundation stone of the extension of this asylum has just been laid. The new wing is to be built at the south-east angle of the Brooke Wing, and will be about 150 ft. long and two stories high, the ground floor for the accommodation of fifty cripples, and the first floor (which is level with the ground floor of the main building) for fifty epileptic patients. The plan is on the pavilion principle, and each floor consists of a day-room 54 ft. by 32 ft. at the end, with a smaller room opening out of the main room; two dormitories, one 60 ft. long and the other 41 ft. long, and 27 ft. wide, projecting at right angles from the main corridor; a stone staircase, and lavatory, bath-room, and water-closets, &c., in separate blocks, with a disconnecting corridor. A sitting-room and a bedroom are provided on each floor for a married couple as attendants. The floors of the corridors and offices will be fire-proof, laid with wood blocks and tiles, and the walls lined partly with glazed brick, all the angles being rounded. There will be a hydraulic lift. The materials used and the style of architecture will correspond with the present buildings. The work will be carried out under the superintendence of the architects, Messrs. Austin & Paley, Lancaster. The contractors are as follow:—Mason's work, Mr. James Toms, Grange-over-Sands; joiners' work, Messrs. Gradwell & Co., Barrow-in-Furness; slaters' work, Mr. James Season, Leeds; plasterers' work, Mr. Oswald Lister, Ilkley; plumbers and glaziers' work, Messrs. Braithwaite & Co., Leeds; heating, Messrs. A. Seward & Co., Lancaster; painting, Mr. E. Payne, Lancaster. The cost of the new block, without furniture, is estimated at about 15,000*l.*

CLUB HOUSE, BRIDLINGTON.—A new club-house for the Yorkshire Yacht Club-house Company, Limited, has just been opened at Bridlington. Mr. W. S. Walker was the architect, and the contract for building was let to Messrs. Whittaker Brothers.

POLICE OFFICES, KILMARNOCK.—The Burgh Police Offices in Sturrock-street were opened on the 22nd ult. The building consists of court hall, magistrates' room, chief constable's room, charge room, guard room, and sixteen cells. The architect was Mr. W. W. Reid.

CHURCH RESTORATION, LEGERWOOD, N.B.—On the 25th ult. this church was reopened after having undergone considerable restoration, and being added to in many particulars. The building has all its ancient masonry intact for some height above the foundation. A Norman porch, with outer and inner doors, has been built for the south entrance. The chancel is roofed with British oak, and a ceiling of the same material formed within the intersecting timbers, which are moulded and rest on short hammer beams laid on the large oak beams carried by the angle pillars. The work has been carried out by local tradesmen from plans by Messrs. Hardy & Wight, architects, Edinburgh.

RESTORATION OF INNERPEFFRAY CHURCH, CRIEFF, N.B.—The ancient church or chapel of Innerpeffray, situated in an elevated position near the River Earn, three miles east of Crieff, has recently been restored. The roof of the chapel has been thoroughly overhauled and repaired with stone slates in keeping with the old roof. An improvement has been made by the removal of the soil all round the church, and exposing a fine dressed double base course, which was hidden before. Oak doors studded with iron bolts have been put up, and the floor of the chapel has been levelled. The architect was Mr. G. T. Ewing, of Crieff.

HOME FOR GIRLS, LANCASTER.—The Stoney Home for feeble-minded girls was recently opened by the Countess of Bective. The home will accommodate forty of the senior and more intelligent girls, who have either completed their training in the Royal Albert Asylum, or are entering upon their last year of residence there prior to discharge. The building, which was designed by the late Mr. E. H. Howard Dawson, of Lancaster, and has been carried out by his successor, Mr. Chas. J. Ashworth, architect, of Lancaster, occupies a site on the west side of Ashton-road, the main front facing the Royal Albert Asylum. The walls are built of local stone, faced with broken courses. The roofs are covered with Westmorland green slates and red terra-cotta ridges and finials. The gables are of half-timber work, with panels of tinted cement stucco, and finished with moulded barge-boards.

BOARD SCHOOL, BARRY ISLAND.—The Barry School Board have recently opened an infant school on Barry Island. The building is of red brick, with Forest stone dressings, and consists of two school-rooms divided by a movable partition, two class-rooms, babies' room, and cloak room, &c., the accommodation being for 288. A special feature has been made of the arrangements for ventilation and heating, as the Board wished to secure the greatest possible hygienic results, and, upon the recommendation of the architect, they decided to adopt mechanical means on the plenum system, as being the most efficacious to secure thorough ventilation throughout both summer and winter. The plant is fixed in a roomy basement under the cloak-room, and comprises a powerful heater, fan, and a gas-engine for driving the latter. The air is filtered before passing through the fan, so as to remove all impurities; it is then forced over and around the heater, and then along glazed earthenware flues to the different points as required. The fresh, pure air, which is heated in the winter and is cool in the summer, is delivered through ornamental register gratings overhead into the various rooms, and, after making a circuit of

them, takes its exit through extractors near the floor. Thus any portion of the air becoming vitiated is at once removed from the rooms. We are informed that a series of trials has shown that the results are highly successful, the air, after being admitted, being thoroughly diffused without any perceptible draught, although in some instances the entire volume in a room is changed once in about ten minutes. The installation, although exceedingly simple, is very complete in every respect, and provision has been made for its extension to the further block of school buildings which the Board contemplate erecting. Although ordinary fresh air inlets and fanlights are provided to be used in case of necessity, the teachers prefer to have them closed as they consider, after testing the system, that the filtered air as delivered by the fan is far more agreeable and pure than that coming in by the ordinary inlets. The whole of the work has been carried out under the superintendence of the architect, Mr. G. A. Birkenhead, of Cardiff. The heating and ventilating apparatus has been laid down by Messrs. Musgrave & Co., of Belfast, and the contractor for the building was Mr. J. Lewis, of Cadoxton, Barry.

SUNDAY SCHOOL, PERRAN-AR-WORTHAL, CORNWALL.—A church Sunday school has just been opened at Perran-ar-worthal. The building is constructed of local stone with granite facings. The main room is lighted by six lights. The work has been executed by contract from plans by Mr. Swift, of Truro. Mr. E. Barnicoat, of Mylor, has done the masonry, and Messrs. J. and G. Row the carpentry.

SCHOOLS, WHITWELL.—New church schools have just been erected at Whitwell. The new buildings are Gothic in style, and accommodation is provided for 150 pupils in each of the boys' and girls' schools, which include in each case one large room and three class rooms. In the infants' department accommodation is provided for 350, including one large class room and other conveniences. The architect was Mr. Joseph Smith, of Sheffield.

OFFICES, BRISTOL. — New offices are being erected in Telephone-avenue, Baldwin-street, Bristol, for the directors of the National Telephone Co. The frontage of the new building will extend for a distance of about 104 ft. towards Telephone-avenue, which is to be the name of the street connecting Baldwin-street and Marsh-street, and it is to be faced with Cattybrook bricks, with stone dressings. On the ground floor are an entrance hall, with offices for the local manager and staff, and public call rooms. The switch room occupies the whole of the rear portion of the building, and is 73 ft. long and 31 ft. wide, lighted from the roof. On the same floor are girls' dining-rooms, kitchen, cloak-rooms, and lavatories. The first and second floors are devoted to offices for the district manager and staff, and for the various departments. On the lower ground floor are the test rooms, instrument room, general stores, strong room, lavatories, workmen's rooms, &c. The contractors are Messrs. W. Cowlin and Sons, and the work is being carried out from the designs, and under the superintendence of Mr. Edward Gabriel (Edmeston & Gabriel), of Bristol and London.

SCHOOL-CHAPEL, RUGBY.—On the 1st inst. the Archbishop of Canterbury visited Rugby and reopened the school chapel and unveiled a stained glass window in memory of Dean Goulburn; he afterwards uncovered a memorial slab, with medallion portrait, of the late Archbishop of Canterbury (Dr. Benson). On account of the increase in the number of boys in the school it became necessary to make further sitting accommodation in the chapel. For this purpose the whole of the west end has been remodelled in memory of the Rev. P. Bowden Smith. Aisles have been provided and a great west window introduced. Additional accommodation has been provided for eighty boys. The work of remodelling has taken about twelve months to complete. The memorial-window, the subject of which is Christ Blessing Little Children, is the work of Mr. Jackson, R.A., the architect of the school-chapel. On the opposite side of the south transept to the window is the medallion portrait of Dr. Benson. Mr. Bruce Joy, R.H.A., is the sculptor. —*Times.*

OFFICES, EDINBURGH LIFE ASSURANCE, BRISTOL.—A new building for the Edinburgh Life Assurance Company has recently been erected at the corner of Baldwin-street and Marsh-street, Bristol. It is constructed of red brick with pennant and Bath stone dressings, the roof being covered with Bangor slate. The style is Georgian. The building has wood block floors with the exception of the ground-floor, entrance-hall, and passages, which are of marble mosaic. The building comprises five floors, each with lavatory and strong-room accommodation. The electric light has been carried to each room and passage, and the gas brought to all fireplaces. The staircase is in oak. Mr. A. J. Beaven is the builder. The architect is Mr. James Hart, of Bristol. The sanitary appliances have been provided by Mr. A. S. Scull.

VICARAGE, NEWLAND, HULL.—The foundation-stone of the vicarage in connexion with St. Augustine's Parish Church, Newland, has just been laid. The architect of the building, which will be 38 ft. 6 in. by 30 ft., is Mr. Temple Moore, of Westminster, and the contractor is Mr. T. Goates, who also built the church.

SCHOOLS, ST. LAWRENCE, VENTNOR.—The opening of the new parochial schools at St. Lawrence took place a few days ago. The architects are Messrs. Colson, Farrow, & Nesbit, of Winchester, and the builders, Messrs. Ingram & Sons, of Ventnor. The building is of native stone with brick facings.

SANITARY AND ENGINEERING NEWS.

DRAINAGE OF MIDDLESBROUGH.—At a special meeting, on the 29th ult., the Sanitary Committee of the Middlesbrough Corporation considered a report made by Mr. J. Mansergh, C.E., with regard to the drainage of the town, and more particularly as to the measures necessary to prevent flooding in the marsh district. The recommendations of Mr. Mansergh embodied a scheme which would cost 40,000*l.* The Surveyor was requested to prepare specifications for a new iron sewer in Marsh-road, this being a very small portion of the entire scheme.

THE PURLEIGH DISTRICT WATER SCHEME.—Major-General H. D. Crozier, R.E., an Inspector of the Local Government Board, held an inquiry in the board-room at the Maldon Workhouse recently with respect to the application made by the Maldon Rural District Council for sanction to borrow 10,775*l.* for a water supply scheme for the parishes of Althorne, Cold Norton, Hazeleigh, Latchingdon, North Fambridge, Purleigh, Stow Maries, and Woodham Mortimer. Among those present was the engineer and surveyor, Mr. H. G. Keywood.

MEXBOROUGH SEWERAGE SCHEME.—The Local Government Board have approved the sewerage scheme submitted by the Surveyor (Mr. G. Fenwick Carter). The gravitation main will be 5 ft. 3 in. by 3 ft. 6 in. by 1 ft. 9 in. diameter; pumping engines, &c., of the double-cylinder horizontal type, with 10½ in. diameter, and 24 in. stroke, diameter of pump cylinders 10½ in., stroke 24 in., each capable of pumping 20,000 gallons per hour, the head inclusive of suction 46 ft. 3 in., delivery about 700 ft. The filters are on the biological system.

STAINED GLASS AND DECORATION.

WINDOW, MANCHESTER CATHEDRAL.—Messrs. Shrigley & Hunt, of Lancaster, have recently completed a stained-glass window, which is now being placed in the Bishop Fraser Chapel, at Manchester Cathedral, and is to the memory of Mrs. Agnes Fraser, the wife of the deceased prelate.

NEW WINDOWS, OLDBURY.—During the renovation of the Wesleyan Church at Oldbury, near Birmingham, a memorial window to the late Ezra Hadley, of that town (subject, "The Ascension"), and one to the deceased members of the choir (subject, "A Choir of Angels Rejoicing"), have been erected. The work was designed by Mr. T. W. Camm, of Smethwick, and executed at his studio.

NEW WINDOW, ST. LUKE'S, KEW. — A stained-glass window has been added to St. Luke's Church, Kew Gardens, in commemoration of her Majesty's sixty years' reign. The three lights are devoted to the representation of Our Lord as the Heavenly King, habited in the robes appropriate to Priest, King, and Royal Majesty. Over the central figure hovers the dove, surrounded by the nine orders of angels; and on the right and left stand the cherubim and seraphim covered with wings. The archangels, St. Michael and St. Gabriel, are placed before the throne; while in the lights next the centre the Virtues are shown offering up the prayers of the saints with incense. The window was designed and carried out by Mr. T. F. Curtis, of Messrs. Ward & Hughes, Soho.

WINDOW, ST. EDWARD'S CHURCH, STOW-ON-THE-WOLD.—During the last few weeks, Messrs. Wailes & Strang, of Newcastle, have erected a window in St. Edward's Church, Stow-on-the Wold, Gloucestershire. The same artists have recently erected a two-lighted window in the parish church of Charnock Richard, Coppull, Lancashire.

FOREIGN.

FRANCE.—Two large allegorical compositions by M. Sinibaldi, which were in the Champ de Mars Salon this year, have just been fixed in the Hall of the Ministry of Commerce.——The designs sent in for the seventh annual competition of the "Société Nationale des Architectes" of France are at present on view at No. 3 Rue de Lutèce. The subject is a "Pavillon de Repos" in an International Exhibition.——Last Sunday, the statue of J. F. Millet was inaugurated at his native town, Gréville, having been raised by public subscription. M. Marcel Jacques is the sculptor.——The Commission des Monuments Historiques is carrying out, under the direction of its architects, the restoration of the ancient church of Notre Dame at Folgoët. The church, which dates from the fifteenth and sixteenth centuries, has two towers on the façade, one surmounted with a spire, the other with a Renaissance lantern. Before the west doorway are the remains of a cross erected by Cardinal Alain, whose statue, in stone, is still in existence. The south porch—the "Portique des Apôtres"—is decorated with very fine sculpture. In the interior the most interesting portions are the Chapelle de la Croix, the Treasure chamber, and a curious rood loft or jubé.——It is announced that the Chantilly Museum will be closed for the winter on the 15th inst.——The Municipality of Marseilles has a scheme for getting water from a spring at the Fontaine l'Eveque, in the Department of the Var using the lake of Allos as a reservoir. The work will occupy about six years, at a cost of about 14 million francs.——A considerable portion of the new Sorbonne building will be ready for occupation during the present year. The Faculté des Lettres will have at its disposal the large amphitheatre and the theatres of geography and archæology. Those of Mathematics and Botany will also be ready, and the large tower of Astronomy, which rises above the general mass of the building. The Richelieu Theatre is to be the object of an important decorative scheme, to be carried out by MM. Dagnan-Bouveret, Toudouze, Comerre, and Jules Ferry.——The death is announced of M. Albert Fernique, the engineer, at the age of 57. M. Fernique was Director of the Machine Drawing School at the Ecole Centrale des Arts et Manufactures, and member of the French "Société des Ingénieurs Civils." He was made Chevalier of the Legion of Honour for exceptional services during the siege of Paris. He rendered great assistance also in the improvement of photography.——The death is also announced of M. Lauzat, engraver and lithographic artist, at the age of 33. He had undertaken the reproduction in lithography of the works of Puvis de Chavannes, as well as a large mural decoration which he was occupied on at the time of his death.——The Cernuschi Museum is to be officially opened on the 12th inst. by the President of the Department of Fine Arts and Public Instruction.

REGISTRATION OF ARCHITECTS IN CANADA.—According to the *Canadian Architect*, the Quebec Architects' Act came into operation on September 1, on which date the period allowed for registration under the Act expired. It is understood that upwards of one hundred applications have been received from persons desiring to register and thereby be authorised to use the title "Architect." The Council of the Province of Quebec Association of Architects have been busily engaged of late with these and other matters pertaining to the operation of the new law. Arrangements are also in progress for the annual meeting of the Association, the exact date for which has not yet been fixed, but which is expected to take place towards the close of October.

MISCELLANEOUS.

LABOUR MARKET IN THE COLONIES.—The latest circular from the Emigrants' Information Office (31, Broadway, Westminster) states that as regards mechanics, all the Colonies are fairly well supplied with them, and in some of the larger towns, as St. John (New Brunswick), Toronto, Adelaide, Melbourne, and Sydney, the supply is more than sufficient. In Western Australia there has been hitherto a considerable demand for carpenters, masons, and others on the construction of numerous Government Works, but as several of these works have lately been completed, many hands have been discharged and have become available to supply any demand that may arise elsewhere in the Colony. In New Zealand there has been plenty of employment in the building, engineering, and most other trades, but the local supply of men has been generally sufficient. In Cape Colony and Natal the demand for mechanics is small, and any demand is met by men who have left the Transvaal, owing to the great depression which exists there. In many parts, however, of Australasia and South Africa there is a reasonable prospect of employment for a really competent mechanic, if he can afford to keep himself for the first few weeks, while he is looking about for work; and he has often a much better opening for placing his children than he would have here.

GLASGOW WATER-PIPE CONTRACT.—At a recent meeting of the Water Committee a letter was read from Messrs. Robert M'Laren & Co., Glasgow, whose offer to supply 995 tons of water-piping at 4,958*l.* 7s. 4d. was recommended for acceptance by the Committee, withdrawing their offer. This course is taken by them in view of the decision of the Council overturning that recommendation, and agreeing to divide their contract, giving Messrs. M'Laren two-thirds, and Messrs. R. D. Wood & Co., Philadelphia, who were the lowest offerers, one-third. The pipes to be supplied by the American firm were those from 7 in. to 12 in. diameter, and those by the local firm from 3 in. to 6 in. Messrs. M'Laren state that they had given an overhead price for the full contract, and that they could not undertake to accept the contract for the limited supply of small pipes unless they got 13s. a ton more.

YORKSHIRE FEDERATION OF THE BUILDING TRADES.—The annual meeting of the Yorkshire Federation of the Building Trades took place on the 22nd ult. at the Royal Exchange, Leeds, Alderman Jessop, Mayor of Huddersfield, presiding. Representatives attended from Leeds, Bradford, Sheffield, Hull, Huddersfield, York, Halifax, Barnsley, Dewsbury, Wakefield, and other centres. The following were elected officers for the ensuing year, viz.:—President, Mr. John Spink (Sheffield); vice-President, Mr. W. Nicholson (Leeds); Secretary, Mr. Hanson (Halifax); Treasurer, Mr. Thompson (Dewsbury); Auditors, Mr. Dews (Leeds) and Mr. Dawson (Huddersfield). A report was presented with regard to the work of

the past year, and, along with the balance-sheet, was unanimously adopted. The number of federated firms in Yorkshire was stated to be 1,250. Reports were received from every town as to the state of trade and the labour market, and information was given concerning the late dispute between the Lancashire and Cheshire Federation and the masons of those counties, which had arisen on the question of worked stone. After a stoppage of some weeks, it appeared, the men had acceded to the masters' terms. There were also handed in reports on the various minor disputes which occurred during the year in the building trade, and which were fortunately settled without intervention of the Federation; and details were discussed of matters of special interest, such, for instance, as the new Workmen's Compensation Act, the apprenticeship question, and the affiliation of all the federated districts of England; and it was decided that measures should be taken to ascertain the feeling of the masters throughout the country with a view to preparing an adjustment. The system adopted by some contractors of paying advanced rates of wages above the standard rates arranged between employers and workmen, was strongly deprecated by the meeting, and it was agreed that steps should be taken to prevent such action in the future. In reference to all important matters affecting the trade at this time, it was resolved to co-operate with the whole of the remaining county federations. Reports were submitted to the Executive from the different towns as to the desire for universal agreement between architects and contractors, and it was understood that an endeavour is being made to ensure fair and reasonable contract agreement between the two parties. The extreme pressure in the building trade, it was pointed out, has now greatly diminished, and there are very few contracts of any size for which tenders are being asked.—*Yorkshire Post.*

Newcastle Society of Antiquaries.—A meeting of the Newcastle Society of Antiquaries was held on the 28th ult., in the library of the Old Castle, Mr. Richard Welford presiding. Mr. Walter Corder and Mr. Wigham Richardson contributed photographs of Carville Hall, and received the thanks of the Society. Mr. M. H. Graham exhibited plans of the Companies' Halls at the Friars, Newcastle, showing the contemplated alterations. He stated that the old stones were to be left, and the ancient features preserved, as far as possible. The place was to be made into a dwelling house. Mr. Graham was thanked by the members. Mr. C. S. Terry contributed a paper on "The Siege of Newcastle by the Scots in 1644." As a result of his investigations, he was able to present a detailed account of the disposition of the attacking force and the defence. Mr. Terry explained how the breaches were made in the walls, and how the Scots made their final assault and captured the town, on October 19, 1644. The material damage done during the course of the siege was considerable. Of the four churches, St. John's was the only one that escaped serious damage. The wall, the main fortification of the town, naturally suffered very material damage.

Electric Lighting at Newport, Mon.—A Local Government Board inquiry was held at the Town Hall, Newport, recently, by Mr. Walter A. Ducat, into an application on the part of the Newport Corporation for sanction to borrow 6,150*l.* for the purpose of electric lighting, and 760*l.* for a new road-roller, scarifier and roller shed at Maindee. The Town Clerk (Mr. A. A. Newman) explained that the total expenditure to date on the electric lighting of the town was 74,665*l.*, and the present application would, if granted, bring the total up to 80,815*l.* Of the amount now asked for, 5,000*l.* was for sub-stations and transformers (of which there would be three, viz., at Cardiff-road, at Albion-street, and one at Maindee), and for low tension distributing mains and high tension mains and feeders; and 1,150*l.* was for emergency plant. Mr. Robert Hammond, the consulting electrical engineer, gave evidence, and said he knew of no town in England where building development had been so marked, in consequence of leases falling in, and small premises making way for buildings of a very high class.

Aberdeen Granite Exports to America.—The declared value of the polished granite exported to the United States during the year ended 30th ult. was $128,207. This branch of the Aberdeen granite trade has, owing to the increase of the United States tariff and the risk involved, been falling off for a number of years back.

An Employer's Liability for a Defective Scaffold.—At the Bolton County Court on the 28th ult. a joiner named James E. Kelly was awarded 250*l.* against Messrs. J. H. & G. Marsden, Bridge-street Saw Mills, for loss of employment caused through injuries sustained by falling from a defective scaffold in April. Liability was admitted, and the case was only brought forward for the assessing of damages.—*Manchester Guardian.*

The Royal Exchange.—The unveiling of the new panels in the Royal Exchange by the Lord Mayor has been fixed for Monday next, October 10, at half-past twelve o'clock. One of the panels—the gift of the Corporation of London, is by Mr. Seymour Lucas, R.A., and depicts William the Conqueror granting a charter to the citizens of London. It was recently exhibited at the Royal Academy. The other, by Mr. Sigismund Goetze, is the gift of Mr. Carl Meyer, and the subject is the offer of the Crown to Richard III.—*Times.*

The Workmen's Compensation Act.—As will be seen from an advertisement which appears in another part of this issue, the Liverpool Board of Legal Studies have arranged for the delivery of a course of lectures dealing with the liability of employers to compensate their workmen for injuries sustained in the course of their employment. The lectures, which will be delivered weekly on Monday evenings at 8 p.m., at University College, Liverpool, will be by Dr. A. P. Thomas, barrister at law. Seven lectures will be delivered, and the date of the first is the 17th inst. In view of the uncertainty in the minds of employers and employed as to the scope of the Act which came into force last July, the lectures, which will be popular and non-technical in character, will no doubt be of interest and value. Similar courses might with advantage be arranged in other cities.

King's College: Report on Prizes.—According to a Report by Professor Banister Fletcher, dated September 30, the competition for the free scholarships, the gift of the Company of Carpenters, took place in the College on September 26. There were ten candidates, of whom eight sat for examination. The result was:—A. J. Wade, first; G. H. Briggs, second. The following figures show the growth of the Architectural Classes during the last five years:—

Session	No. of students entered attending the classes.
1892-1893	28
1893-1894	42
1894-1895	75
1895-1896	120
1897-1898	145

The Report refers to the results obtained by students who had sat for outside examinations, the proportion of failures being but 15 per cent. In the Architectural History Class the prizes were awarded as follows:—F. G. Pain, gold medal*; C. J. T. Dadd, silver medal and 3*l.* in books; W. Marchment, bronze medal and 2*l.* in books; W. G. Trew, certificate of distinction and 1*l.* in books. In the Architectural History Drawing Class the prize winners are:—C. J. T. Dadd, certificate and 2*l.* in books; W. G. Trew, certificate and 1*l.* in books. The Architectural Studio, which is open every day and evening, has continued to be of great use to the students. It has been attended by eighteen students and much good work has been done. There has been a satisfactory increase of the day students. Many of the students are preparing their "Testimonies of Study" for the R.I.B.A. examinations, while others simply come and improve their powers of design and drawing and make practical working drawings of buildings to be erected.

Durham and Northumberland Archæological Society.—The members of the Archæological and Architectural Society of Durham and Northumberland held their fifth outdoor meeting of the season on the 29th ult., the places visited being Newburn, Heddon, and Ryton. They assembled at the Central Railway Station, Newcastle, at half past ten, and drove to the first mentioned place by way of Benwell. Newburn Parish Church was visited. The edifice contains many objects of great interest to the archæologist and the architect, and these were pointed out and described by Mr. C. C. Hodges, who also sketched the history of the church. The scheme of renovation and decoration recently completed at a cost of about 4,000*l.* was described by the vicar, the Rev. Dr. Nowell. After leaving the church, the party entered their conveyances and proceeded to Heddon-on-the-Wall, by way of Throckley. At this, the second stage of the excursion, a portion of the Roman Wall was inspected. Heddon Church was visited, and described by Mr. Hodges. He drew attention to the Norman chancel and the chancel arch, which is enriched with the zigzag ornament of that period. The next stopping place was Ryton, which was reached by way of Wylam. The thirteenth century nave received special attention, as did also the lancet windows in the south side of the chancel. A stone effigy of an ecclesiastic, probably an archdeacon, was also noticed, being of early and excellent workmanship. From Ryton the homeward journey was commenced.—*Newcastle Journal.*

Aberdeen Corporation Tramways.—The city tramway undertaking was transferred to the municipality about six weeks ago. It has now been resolved to apply to Parliament in next session for a provisional order to authorise the reconstruction of the line from Kittybrewster to Woodside, and the adaptation of the whole section from the Queen's statue to Woodside for electric traction at a cost (exclusive of cars) 21,400*l.*

Pulpit, Church of the Sacred Heart, Exeter.—A pulpit, together with a new altar rail and sanctuary steps, have just been fixed at the Roman Catholic Church of the Sacred Heart, South-street, Exeter. The sanctuary steps are three in number, and of polished Devonshire marble. On the first step, which breaks out into the nave, is the altar rail of similar stone. Each side is divided by piers into five compartments. The pulpit is composed of Derbyshire and Devonshire marble and Beer stone. It is moulded, and in the niches are statuettes of the evangelists—Saints Matthew, Mark, Luke, and John—Saints Ambrose, Augustine, Gregory, and Jerome. The pulpit is approached from the east side by a flight of marble steps. The work was designed by Mr. C. E. Ware, and was executed by Mr. H. Read, of Exeter, who is also at work upon a shrine, also designed by Mr. Ware, which will be fixed in the position occupied by the old pulpit.

"N.A.P." Window Improvements.—The N.A.P Window Company have had on view, at 65, Gracechurch-street, full-size examples of their various improvements in windows. The company originally started with the idea of enabling the sash window to be cleaned from the inside of a room without the necessity of standing upon the sills and thus often causing loss of life, but their improvements have extended to fittings of all kinds and purposes, and embrace many forms of sliding and inward opening windows, which latter also greatly facilitate the cultivation of window gardening. At the exhibition referred to the fittings are applied to single and double casements in wood by means of a moveable water bar and double knuckle hinge which enable a window ordinarily opening outwards to be opened into the room for cleaning purposes. Others show the application of the principle to existing sash-windows. Steel casements are treated in the same way. Fanlights—always difficult to manage—are treated with passable hopper cheeks and stays which enable the lights to be swung inwards for cleaning. Another improvement is the air-tight centres for fanlights, which surmounts the difficulty of covering the straight joint at the centre. Amongst other improvements we noticed also the wet and draught excluder with condensation channel, suitable for French casements, in which the door being opened, no projection remains likely to trip up a person passing through. Other improvements in fittings are shown which exhibit ingenuity and are likely to render window furniture less clumsy than heretofore. A luncheon was given in connexion with the exhibition. Mr. W. Youlten (managing director of the company) presided. The Chairman having submitted the toast of "The Queen," Mr. J. Starkie Gardiner, in response to the toast of "The (New) N.A.P. Window Company, Limited," said he was induced to support the syndicate from the philanthropic side of the question, as he felt very strongly that the accidents caused by window cleaning ought to be, if not prevented, at all events reduced in number. The Chairman said that for some time past the present syndicate had been unable to cope with the work offered it. During the last year or two he had been approached by people to form a company on a large scale, but all along he had desired to wait until the trial tests had proved successful. Now this has been accomplished, a new company would be floated, and the subscribers would have the satisfaction of knowing that the inventions which the company was to acquire had given every satisfaction to experts and to users. In answer to circulars issued to architects asking for their opinion, the company had been sent the replies received by architects from their clients who had proved the advantages of the N.A.P. window, and the effect of the opinions was that the clients could not understand why the N.A.P. windows had not been used throughout. Mr. William O'Malley gave the toast of the Chairman. Mr. E. R. Speirs supported the toast, and Mr. Youlten, in acknowledging the compliment, stated that from the first he had had the flattering support of some of the most eminent men in the building trade. The proceedings shortly after terminated.

Aberdeen Art Exhibition.—The ninth exhibition of pictures and sculpture in connexion with the Aberdeen Artists' Society was opened in the Art Gallery on Tuesday. Including loan and permanent collection, there are over 600 exhibits.

* A gold medal was given in recognition of the fact that the student obtained first place in the examination for three consecutive years.

CAPITAL AND LABOUR.

Swansea Corporation Masons.—Mr. Geo. Bell, the Borough Surveyor, reported at a meeting of the Streets Committee of the Swansea Corporation recently that he had received a letter from the secretary of the Masons' Society, asking that the wages of the masons under the Corporation should be in accordance with the Trades Union rate—8½d. per hour. The Borough Surveyor recommended that this rate be paid as from the date of the recent masons' strike. Alderman Leeder, who presided, thought that the men would be sorry if the increase were granted, as it would lead to more work being let by contract. The masons' request was granted.

LEGAL.

CASE UNDER THE LONDON BUILDING ACT.

At the North London Police-court, Messrs. Peck & Forecast, the owners of the "Kenton Arms," Kenton-road, South Hackney, were summoned, at the instance of the London County Council, for

erecting a structure in connexion with the public-house beyond the general building line.—Mr. Chilvers appeared for the Council and Mr. Disney, barrister, was for the defendants.—The facts were singular. At the public-house a lavatory had existed which was approached from one of the bars. The licensing justices objected to this, and selected a spot at the end of the wall of the garden of the house for a new convenience to be erected. The Hackney Vestry approved, and the structure was erected under the supervision of Mr. Alexander Payne, the District Surveyor, who duly received his fees. A builder who did not get the contract, however, discovered that the erection was beyond the general building line in Kenton-road, and he complained. Then Mr. Payne sent in a notice of irregularity.—Mr. Disney said that if there had been any infringement it had been done with the sanction of an officer of the Council. An existing wall had simply been raised from 5 ft. to 8 ft. A door had been provided, and another wall had been built inside.—Mr. Chilvers contended that the convenience was clearly a structure within the meaning of the Act, although he admitted that the footpath had not been encroached upon by the alteration. The structure was, nevertheless, 5 ft. beyond the general line.—Mr. Bros imposed a penalty of 40s., with 2s. costs.—*Morning Advertiser.*

MEETINGS.

FRIDAY, OCTOBER 7.

Architectural Association.—President's Opening Address and Distribution of Prizes. 7.30 p.m.

MONDAY, OCTOBER 10.

University College.—Professor Roger Smith on "Students' Difficulties." 7.30 p.m.

TUESDAY, OCTOBER 11.

Northampton Institute, Clerkenwell.—Mr. F. Bond on "Origin of Romanesque." 8 p.m.

THURSDAY, OCTOBER 13.

Carpenters' Hall, London Wall (Free Lectures on Building and Sanitary Construction.)—Professor T. Roger Smith on "Site, Foundations, and Sanitary Requirements."—I. 7.30 p.m.

FRIDAY, OCTOBER 14.

Institute of Junior Engineers (Westminster Palace Hotel).—Annual General Meeting: Council's Report, Election of Officers for Eighteenth Session, &c. 8 p.m.

Glasgow and West of Scotland Technical College (Architectural Craftsman's Society).—Mr. J. Jardine on "Life as a Foreman of Works in the Gold Coast." 8 p.m.

Architectural Association Discussion Section.—Mr. C. F. Mallows on Church "Restoration." 7 p.m.

RECENT PATENTS:

ABSTRACTS OF ACCEPTED SPECIFICATIONS.

Open to opposition until November 14

[1897.]—20,371.—SAFETY SPIRIT BURNER AND COOKING APPARATUS: *V. Hess & J. Mathei.*—To obviate the use of fluid spirit is employed a quantity of compressed cotton wool as an absorbent of the liquid fuel, whose alcoholic or similar vapour rises through a thin layer of asbestos wool or fabric placed upon the cotton wool; a further covering of wire gauze, above which the vapour is ignited, is placed over the asbestos wool. Air is supplied through a tube in the container which holds the cotton wool, and a hinged lid extinguishes the "Bunsen" flame as occasion requires.

20,834.—ARC LAMPS: *J. D. F. Andrews.*—The invention comprises (*a*) the combination of a long solenoid, a long core tube, and a long dash pot to act continuously without gearing throughout the length or feeding range of the carbons; (*b*) the construction of an arc-enclosing globe having an inner lining of mica or glass to minimise the darkening of the glass; (*c*) the combination of a core, guide tube, and globe; and (*d*) an arc-lamp with a core and solenoid and globe wherein the lower carbon is fixed, the core and globe being suspended on opposite ends of a cord passed over pulleys to retain the arc in a nearly fixed position.

21,993.—THAWING FROST OUT OF LAND, STONE, MORTAR, &c.: *P. Watt.*—Hot air, with or without flame, is impelled where required by mechanical means; the blast produced by a fan, worked by hand or motive power, is driven through fuel down a generator through adjustable ball-jointed pipes which direct the flame and air upon the mass which is to be thawed.

24,313.—GRIP-BLOCKS FOR USE WITH GIRDERS AND PROPS: *J. C. Cadman & J. T. Minshall.*—The metal grip-blocks have a grooved or ledged portion at each of their sides so that they may be readily slid on to the flanges of the girders before the ends of the latter are placed on the props, a tapering metal bolt, key, or wedge, being placed through a hole or slot in the block and secured by a nut; the blocks may also be formed in two halves, to be joined by bolts.

24,604.—WATER WASTE PREVENTERS: *J. H. Harris.*—This apparatus consists of a cistern and a syphon whose longer leg is bedded upon a seat at the upper end of the discharge pipe and rocks about a pivot so that it can be slightly raised from the seat; by this arrangement, when the longer leg is raised, water will flow beyond its lower end to start syphonical action which continues until after the syphon has returned to its normal position and until the water level is reduced to a point whereat air is admitted into the syphon's shorter leg; the syphon is adjusted to the float ball lever in such a manner that when the chain is pulled down the syphon raises the lever and causes the valve to shut off the water as long as the chain is held down.

24,673.—SHOWER BATHS: *A. H. W. Wedler.*—The water is led into the side of the distributing chamber, within which it centrifugally revolves, and then passes out through a nozzle in the cap of the exit pipe; thus are provided a regular and even shower with ready means of clearing the rose; the appliance can be adapted for overhead baths, or for attachment to a flexible hose.

25,383.—GULLEY TRAPS: *J. Shaw.*—The trap has an outer shell, an internal cover for the drain's mouth, and an inner receptacle and grate; the internal cover has legs that rest upon the bottom of the shell, leaving a space between the raised outlet and the top of the cover to allow the water to flow over into the mouth of the drain and to form a water seal.

28,605.—CONSTRUCTION OF WALLS, CEILINGS, FLOORS, &c.: *M. Warnecke.*—For fire-proof and insulating walls, floors, &c., the inventor uses a perforated sheet metal-plate so bent that a series of closely-joined triangles are made; the bases of the triangles lie alternately on the top and bottom and form continuous surfaces, the whole constituting a supporting body divided into air chambers, which are closed by joining the corners of the triangles; for circulation of air the inner sides of the triangles are perforated, their bases also are perforated, and the edges produced thereby are bent hook-wise in order to hold the cement.

[1898] 8,366.—ATTACHMENT OF DOOR-KNOBS TO THEIR SPINDLES: *H. J. P. Whipple & L. T. Snow.*—On the neck of the knob is placed an adjusting sleeve which bears, at its inner end, against the bottom of a socket in the rose and is engaged at its outer end by a depressible detent on the neck; the sleeve has, at its outer end, a series of depressions or notches of a progressively increasing depth, and the detent is placed within a recess in the neck's outer surface, having a stem or shank which enters a socket extending transversely into the neck and spindle, whilst a spring, between the shank and the bottom of the socket, exerts outward pressure against the detent; a rounded shoulder at the detent's inner end fills either one of the notches in the sleeve when made to register therewith.

10,706.—BRICKWORK FOUNDATIONS OR SETTINGS AND COVERINGS OF BOILERS AND FURNACES: *C. W. Thomas.*—The claim is for (*a*) making the contact portions of the brickwork foundation or setting of an acute angular edged or tipped construction, and forming the faces of the adjacent brickwork at a sharp and acute angle or bevel, so that only a line of brickwork contact to the boiler is presented: (*b*) covering-in or arching-over the crown of a boiler or furnace, when fixed, with tiles or slabs having acute angular edges; and (*c*) a combination of the foregoing methods.

12,520.—WATER-CLOSETS: *F. Ferracciu.*—The improvement lies in the adoption of curved pipes or conduits for supplying three columns of water discharge: one column flows by a passage extending above and around the pan's interior, and having holes in its lower part through which the water gushes out in small jets, another passes by a tube terminating at the bottom of the pan in a fan-shaped opening, and the third column passes by two tubes branching out on the pan's sides, and so to the bottom thereof. The inventor says that his contrivance "does not require a special reservoir with accompanying apparatus, such as the syphon and automatic valve and adjuncts hitherto used."

12,943.—ORDINARY SCREW-DOWN TAPS: *S. A. Parkes & O. H. Wagner.*—The invention has for its object the construction of a follower valve in the lower part of the barrel of an ordinary screw-down tap or stop-cock, the follower valve having a guide pin from each face, one to ride in a lower stem of the ordinary or upper valve, and the other to ride in a hole made for it in the bottom closing plug, so that the follower valve has free vertical up and down play—thus, on removal of the ordinary valve for repair the follower valve closes the water passage.

16,207.—KEY LOCKS: *T. J. Dickinson.*—The essential feature of the contrivance consists in providing a hinge leaf at one edge of the escutcheon plate of a mortised lock, adapting it to fold over the plate and close the key-hole, and fitting it with a transverse slot for engagement with the key's shank, whereby the key is prevented from turning in the lock. The hinged leaf is locked in position by a gravity latch pivotted thereto, which engages a catch upon the face of the door.

17,166.—COUNTING DEVICE FOR CRANES, &c.: *P. Jablonowsky.*—For recording the movements of a crane, and so counting its loads, is arranged a foot on the under side of the platform, which depresses a bar supported by a spring and having a roller upon its upper end; the motions of the bar are transmitted to a spur-wheel, so that at every two motions of the bar a unit wheel attached to the spur-wheel causes another figure to appear, and after a complete revolution of the unit wheel the ten wheel is turned one figure forwards by means of pegs. The counting is preferably arranged so that two strokes of the presser bar are needed to move the wheel a whole number; it is then possible to read off the number of loads, that is of double movements of the crane, no figure appearing for the return motions.

NEW APPLICATIONS.

September 19—24.

19,794, Mackie & Sutton, Friction and Lever Clutch. 19,799, A. H. Parker, Water Supply for a Lathe Grinding-wheel. 19,803, J. B. de Alzugaray, and 19,974, F. Dannert, Filaments for Electrical Lamps. 19,809, D. Thomson, Oven Doors. 19,811, Harley & Dargie, Wire-rope Grip. 19,813, J. France, Plastic and other Coverings for Mains, Pipes, &c. 19,825, D. Cornthwaite, File-cutting Machines. 19,827-9, B. H. Pomeroy, Electrical Arc Lamps, and Coin-controlled Meters. 19,830, Crawfords, Water and other Cocks and Taps. 19,835, H. Fullwood, and 20,055, B. T. Smith, Door Stops and Checks. 19,838, J. Strachan, Hydrant for Street Water Mains, &c. 19,845, C. S. McIntire, 19,882, Jones & Phibbs, 20,122, B. H. Wallin & Baron R. de Wendel, and 20,127, E. Pellaton, Generation of Acetylene Gas. 19,855, La Société Roger & Rathier, Electrodes. 19,862, M. Barth, Collapsible Ladders. 19,867, F. Baker, Spike and Holdfast for Securing Platforms, Rails, &c. 19,874, E. G. Max Sommer, Oiling Door-locks. 19,875, H. W. Neild, Joint for Electrical Wires. 19,888, F. Higgarty, Flooring or Paving Composition. 19,908, M. Gautier, Automatic Flushing for Sanitary and other Purposes. 19,913, Manhattan General Construction Co., and 20,068, H. G. Cotsworth, Arc Lamps. 19,915, W. Jennings, Raising Gravel, Earth, &c. 19,916, E. Chatham, Mortar-grinding Mills. 19,920, J. S. Clinch, Pipe Joint or Coupling. 19,925, J. A. Whitehead, Workmen's Time Recorder. 19,934, C. M. Green, Nail-driving Machine. 19,939, C. D. Haskins, Electrical Meters. 19,951, E. Seiler, Electrical Gas-lighters. 19,965, C. Pellenz, Poles, Posts, Masts, &c. 19,973, R. Friedrich, Folding-rules. 19,986, Brown & Allen, Recuperative Gas-lamps. 19,988, J. N. Spence, Sanitary Dog Kennels. 20,005, Staley & Parker, Dies for Making Taper Sanitary Pipes. 20,016, A. J. Thurman, Barrel and Similar Taps. 20,017, L. Pierron, Gas Ignition. 20,025, W. Durrant and 20,217, J. Walker, Gulleys, Traps, &c. 20,036, A. Weil, Cement Roofing Tile Presses. 20,037, R. Lokesch, Imitation Enamels. 20,039, T. Thornton and 20,147, Taylers, Circular-saw Guards. 20,047, La Société Weeger Aîné et ses Fils & P. E. Guibillon, Process for Rendering Paints, Paintings, &c., indelible. 20,075, Herriots and 20,165, W. E. Hipkins, Weighing-machines. 20,077, J. Astley, Heald Varnishing Brushes. 20,078, J. Hopper, Sanitary-pipe Joint. 20,100, C. H. Temple, Printing Designs on Tiles, &c. 20,101, W. Youlten, Weather-checks for Casements and Doors. 20,109, B. T. Smith, Window-sash Fastener. 20,114, R. Kowalski, Chimney Cowls and Caps. 20,115, W. P. Thompson, Pressed Wood or Wood and Composition Panels, Brackets, &c. 20,118, R. H. Reeves, Purification of Sewage Effluents. 20,124, J. H. Ellis, Marking, Cutting, and Mortice Gauges. 20,125, Shone & Ault, Pneumatical Lifting Apparatus for Water, Sewage, &c.; and Partial Purification thereof. 20,140, A. R. Jenkins, Apparatus for Watering Streets and Similar Purposes. 20,148, B. de Szwantowski, Digging-machine. 20,166, W. Wood, Lubricating Brick Dies for Making Bricks, Tiles, or Blocks. 20,168, C. Armstrong, Buffers and Fittings of Tilting Tanks for Waste Water-closets. 20,171, E. Mathieson, Decorative, Artistic, or other Painted Devices. 20,180, Cains & Grant-Morris, Facing or Planing Wood and Other Materials. 20,181, C. Andrews, Treatment of Sewage. 20,201, W. Parsons, Casement Window and Door Fastener. 20,207 and 20,209, E. Peyton, Moulds for Foundry and other Casting Purposes. 20,215, Cartlidge & Wade, Kilns. 20,223, J. Bishop, French Polish. 20,226, T. W. Twyford, Butlers' and similar Sinks. 20,230, Coles, Fixing Posts, Rails, and Similar Structures. 20,236-7, W. T. Moss, Compasses or Dividers. 20,245, McNiece & Robinson, Window Sashes. 20,249, W. Budd, Burglar Alarms. 20,265, Dransfield & Vardley, Chisels for Cutting and Working Stone or Similar Substances. 20,268, L. A. Martin, Flexible Pipes. 20,273, E. Verbeke. Bunsen Burners. 20,277, H. Adler, Tubes. 20,278, J. F. Golding, Metallic Sheets or Strips.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

September 16.—By BOULTON & COOPER (at Helmsley).

Wombleton, Yorks.—Various enclosures of land, with houses and cottages thereon, 85 a. 2 r. 6 p., f. (in lots)	£5,781
A freehold farmhouse and 97 a. 2 r. 32 p.	760

September 21.—By WM. HOWLETT (at Great Yarmouth).

Belton, Suffolk.—The Elm Grove Estate, 96 a. 2 r. 0 p., f.	3,200

By R. C. WARRINER (at Lancaster).

Ellel, Lancs.—The Ellel Hall Estate, 171 a. 3 r. 22 p., f.	14,350
"The Whittle and Steel" p.-h., f.	1,200

By DRIVER & CO. (at Braintree).

Wethersfield, Essex.—Two freehold cottages and 0 a. 2 r. 21 p.	151

September 22.—By W. H. SHINER & WINTER (at Bristol).

Whitchurch, Somerset.—Eight enclosures of pasture, 50 a. 1 r. 6 p., f.	3,293
Keynsham, Somerset.—An enclosure of pasture, 6 a. 2 r. 37 p., f.	265

By SIMMONS & SONS (at Banbury).

Great Bourton, Oxon.—Peewit Farm, 97 a. 2 r. 20 p., f.	3,350

By C. C. & T. MOORE.

Bromley-by-Bow.—36 to 44 (even) Fern-st., u.t. 78½ yrs., g.r. 18*l.* 15s.	1,000
Poplar.—23, Pennyfields, and 1 and 2, Elizabeth-cottages, c.	305
Upper East Smithfield.—No. 13, f.	580

September 23.—By NOTT & CARTWRIGHT.

Belgravia.—81, Westbourne-st., 22½ yrs., g.r. 5*l.*, r., 40*l.*	300
Balham.—30, Balham-grove, u.t. 79 yrs., g.r. 8*l.* 8s., r. 32*l.*	285
132, Bedford Hill-rd., u.t. 77 yrs., g.r. 10*l.*, e.r. 55*l.*	600

September 23.—By J. KITTOW (at Exeter).

St. Gennys, Cornwall.—The Crackington Manor Estate, together with Trevigue and Pengold Farms, 2,086 a. 0 r. 27 p. f.	18,200

September 24.—By BRUTON, KNOWLES & CO. (at Gloucester).

Down Hatherley, Glos.—The Park Farm, 111 a. 3 r. 31 p., f.	2,800
Eastington, Glos.—Alkerton Grange, and 4 a. 0 r. 13 p., f.	1,010
Claypits Farm, 136 a. 1 r. 32 p., f.	2,520
A freehold holding, 15 a. 3 r. 38 p.	600
Two houses and garden plot, 1 a. 1 r. 19 p., f.	364
Four enclosures of meadow, 29 a. 2r. 1 p., f.	1,205

September 26.—By WM. HOUGHTON.

Stoke Newington.—89, Cazenore-rd., u.t. 75¾ yrs., g.r. 14*l.*	1,015
Walthamstow.—92, Wood-st. and cottage adjoining, f.	395

By J. C. PLATT.

Hammersmith.—2 and 4, Great Church-lane, f., r. 65*l.*	800
15, Queen's-rd. and 1a, Chancellor-st., u.t. 36 yrs., g.r. 8*l.*	315
Chiswick.—7, Arlington Park-gardens North, u.t. 78½ yrs., g.r. 7*l.* 7s., r. 40*l.*	400

By THOMAS WOODS.

Southall Green, Middlesex.—19 to 26, Denmark-ter., u.t. 63¾ yrs., g.r. 42*l.*, r. 265*l.*	3,245
1a, Western-rd., u.t. 66 yrs., g.r. 5*l.*, r. 32*l.*	405
5, 6, and 7, Alexandra Villas, u.t. 65 yrs., g.r. 12*l.*, r. 77*l.*	660
5 to 10, Denmark Cottages, u.t. 66 yrs., g.r. 12*l.*	550
11 to 32, Dagmar-rd., u.t. 66 yrs., g.r. 44*l.*	2,265
Norwood Green, Middlesex.—1, Harewood-ter., and stables, cart and cow houses adjoining, u.t. 66 yrs., g.r. 23*l.*, r. 3*l.* 8s.	270
North Hyde, Middlesex.—1 to 4 and 9 to 12, Rose Cottages, u.t. 72 yrs., g.r. 11*l.*	615

By CASTIGLIONE & GIBBINGS (at Carlisle).

Hayton, Cumberland.—Fenton Lane End Farm, 46 a., f.	950

September 27.—By H. DONALDSON & SON.

Stoke Newington.—17 to 27 (odd), Shakspeare-rd., u.t. 58¾ yrs., g.r. 25*l.*	1,490

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
Covered Market, &c.	Aberavon Corpn.	20 guineas	Dec. 1
*Pump Room	Harrogate Corp.	50l. 30l. and 20l.	Jan. 2, '99

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
Street, Blackfine, Durham	Benfieldside U.D.C.	J. Dixon, Surv. Durham	Oct. 12
Heating, &c. Mechanics Hall	Rotherham T.C.	Boro Surv. Town Hall	do.
Additions to Presbyterian School, Woole		W. R. Hindmarsh, jun. Archt. Alnwick	do.
Six Cottages, Kingsclere, Berks	Ancient Order of Foresters	W. H. Ball, Archt. Newbury	do.
Asphalte Footpath, &c. Washington, Durham	Chester-le-Street R.D.C.	G. W. Ayton, Surv. Chester-le-Street	do.
*Broken Guernsey Granite	Twickenham U.D.C.	G. B. Laffan, Town Hall, Twickenham	Oct. 13
Church and Schoolroom, Tynewydd-road, Barry Dock	Committee	T. W. Lewis, 160, Holton-road, Barry Dock	do.
Alterations to Boiler House, &c. Crumpsall Workhouse	Prestwich Union	E.W. Ogden, Union Offices Manchester	do.
Two Cottages, Buckland Newton, Dorset		Mr. Vining, 11, Hendford, Yeovil	do.
Sewerage Works	Eccles (Lancs.) Corp.	A. C. Turley, C.E. Town Hall, Eccles	do.
Filter	Reigate U.D.C.	W. H. Prescott, C.E. Market Hall, Redhill, Surrey	do.
Cottage Homes, Cheriton, Kent	Elham Union	R. Lonergan, Saltwood, Hythe	do.
Road Works, Broomhill Estates, Ingrow, Keighley		B. Hopkinson & Co. Archt Craven Bank-chambers, Keighley	do.
Steel and Iron Bridge, East Harling	Norfolk C.C.	T. H. B. Heslop, C.E. Norwich	Oct. 14
Public Baths	Romford U.D.C.	Harrington & Ley, Archt. 108, Fenchurch-st. E.C.	do.
Paving Works, &c.	Preston Corp.	Borough Engr. Town Hall, Preston	do.
Rowing Club Buildings	Gravesend T.C.	Surveyor, Town Hall, Gravesend	do.
Five Cottage Almshouses, Lyme Regis	Marden Trustees	W. J. Fletcher, Archt. Wimborne	Oct. 15
Alterations to Chapel, Trillick	Methodists	Rev. J. Bradshaw, The Manse, Irvinestown	do.
Sewerage Works, Contracts 8, 8A, & 8B	Brighouse Corp.	A. M. Fowler, C.E. Manchester	do.
Vicarage, St. Peter's, Accrington		Austin & Paley, Archt. Castle Hill, Lancaster	do.
Convalescent Home, Fulwood, near Sheffield		Hemsoll & Paterson, Archt. 18, Norfolk-row, Sheffield	do.
Widening Road, Kendal	Westmorland C.C.	J. Bintley, County Surv. 7, Lowther-st. Kendal	do.
Road Works, Whitney-on-Wye, Herefordshire		R. L. Bamford, 138, Widemarsh-st. Hereford	do.
Buildings, Chimney Shaft, &c. at Electric Lighting Station	Rangor Corp.	J. Gill, C.E. 13, Victoria-st. London, S.W.	do.
House, Aynsley-terrace, Consett	R. Wright	J. Doherty, Archt. 24, Sherburn-terrace, Consett	do.
Cast Iron Pipes, 1,429 tons	Glasgow Corp.	J. M'Gale, Engr. 45, John-st. Glasgow	do.
Fifty-three Cottages	Tunbridge Wells Corp.	Boro Surv. Town Hall, Tunbridge Wells	do.
House, Northallerton	G. J. E. Gardner	Clark & Moscrop, Archt. Darlington	do
*Granite, Gravel, and Hoggin	Barnet U.D.C.	Council Office	Oct. 17
Cast-iron Pipes, 12,000 tons	Wishaw Burgh Commissioners	J. Tait, C.E. Wishaw	do.
Painting, &c. Town Hall	Pontypool U.D.C.	R. Williams, Archt. Council's Offices	do.
Additions to House, Brynhyfryd, Ruthin	County School Governors	J. Hughes, Archt. Denbigh	do.
Lunatic Asylum, Portrane	Lunacy Board, Ireland	H. Williams, Custom House, Dublin	do.
Additions Schools, Lorne-street	Leith Sch. Bd.	A. & R. McQuiloch, Archt. 3, Bernard-st. Leith	do.
Church, Bolton-road, Darwen	Wesleyans	J. B. Thornley, Archt. 45, Market-st. Darwen	do.
*Widening Road	Leyton U.D.C.	W. Dawson, Town Hall, Leyton	Oct. 18
Additions to Howell's County Schools, Llandaff	Governors	G. E. Halliday, Archt. Cardiff	do.
Assembly Hall, Llandaff	do.	do.	do.
Stone Bridge, Newhouse Burn	Lanchester R.D.C.	W. Cumming, Surv. Lanchester	do.
*Enlargement of Telegraph Factory	Commrs. H.M. Works	Offices, Storey's Gate, S.W.	do.
*Concreting Bed of part of R. Quaggy	Lewisham Board of Works	Town Hall, Catford, S.E.	do.
*Making-up and Paving Streets	Fulham Vestry	C. Botterill, Town Hall, Walham Green, S.W.	Oct. 19
Stables, Coach-house, &c. Newcastle	Belfast and co. Down Ry. Co.	T. J. Brittain, Queen's Quay, Belfast	do.
Masonic Buildings, Camborne		S. Hill, Archt. Redruth	do.
Painting, &c. Tate Library, South Lambeth-road	Library Comrs.	S. R. J. Smith, Archt. York-bldgs. Adelphi, W.C.	do.
Reservoir, Horseshoe, Ballysillan	Belfast Water Comrs.	A. Ferguson, Surv. 35, Royal Bailey, Belfast	do.
Sewerage Works	Blackpool Corp.	J. Wolstenholme, C.E. St. John's Market-buildings, Blackpool	do.
*Repairs and Alterations at School	Shoreditch Guardians	F. J. Smith, Parliament Mansions-Victoria-st. S.W.	do.
*Additions and Alterations to Vestry Hall	St. George's-in-the-East Vestry	G. A. Wilson, Vestry Hall, Cable-street, E.	Oct. 20

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
*100 Gully Gratings	Bethnal Green Vestry	F. W. Barratt, Vestry Hall Church-row, Bethnal Green	Oct. 20
Asylum Additions, Cholsey, near Wallingford	Visitors	G. T. Hine, Archt. 35, Parliament-st. Westminster, S.W.	do.
Offices, Ovenden, near Halifax	J. Drake & Son	M. Hall, Archt. 29, Northgate, Halifax	Oct. 21
Sewers, &c.	Wilmslow (Cheshire) U.D.C.	W. Cobbett, Swan-street, Wilmslow	do.
*County Offices, Trowbridge	Wilts C.C.	C. S. Adge, County Offices, Trowbridge	Oct. 23
*Various Stores	G. W. Ry. Co.	Stores Superintendent Swindon	Oct. 4
*Making-up Three Streets	Hoddesdon U.D.C.	T. Salkfield, Briscoe-road, Hoddesdon	do.
*Public Slipper Baths	Ratcliffe Vestry	G. E. Holman, 6, King's Bench Walk, Temple, E.C.	do.
*Public Hall and Offices	Llandudno U.D.C.	Silcock & Reay, Octagon-chambers, Milsom-street, Bath	do.
*Gas Engines	London County Council	Engineer's Dept. Spring Gardens, S.W.	Oct. 25
Schools, Locking-road	Weston-super-Mare S.B.	S. J. Wilde, Archt, Weston-super-Mare	Oct. 26
School, Cobbold-road	Wanstead (Essex) Sch. Bd.	J. T. Bressey, Archt. 70, Bishopsgate-st. Within, E.C.	Oct. 27
*Engine and Pumps, Condenser, Pipes, &c.	Cuckfield R.D.C.	J. Mansergh, 5, Victoria-st. S.W.	Nov. 3
*Sewerage Works	Deal Corp.	Baldwin Latham, 13, Victoria-st. S.W.	Nov. 4
*Infirmary and Administrative Block to Workhouse	Horsham Union	C. H. Burstow, 6, West-street, Horsham	No date
Hotel	Bentley's Yorks. Breweries, Ltd.	W. Bakewell, 38, Park-sq. Leeds	do.
Fire Bricks, Varnish, &c.	G. W. Ry. Co.	G. K. Mills, Paddington Station, W.	do.
Mansion, Cornwall		Graham & Graham, Solicitors, Fowey, Cornwall	do.
Schools	Elland S. B.	H. W. Booth, Archt. Hopwood-lane, Halifax	do.
Pulling-down Theatre and Shops, Lime-street, Liverpool		H. Percival, Archt. 22, Buckingham-st. Strand, London, W.C.	do
Shop, Stores, &c. John-street, Foyle-road, London-derry	Lazarus & Co.	R. H. M. Elwee, Archt. 9, Carlisle-road, Derry	do
Houses, Russell-terrace, Carlisle	Johnstone Bros.	Johnstone Bros. Archt. 39, Lowther-st Carlisle	do
Two Villas, Ripon-road, Harrogate	M. Nicholls	T. E. Marshall, Archt. Harrogate	do
Villas, Porthkerry Park, Barry	Building Co. Ltd.	Jones, Richards, & Budgen, Archt. Cardiff	do.
Three Terrace Houses, Whitehead		H. T. Fulton, Archt. 91, Donegall-st. Belfast	do.
Stone Staircase at Workhouse	St. Albans Union Gdns	T. F. Woodman, St. Albans	do.
Additions to Grammar School, Chesterfield		W. H. Wagstaff, C.E. Chesterfield	do.
House, North Walsham		T. J. Goldie, Archt. Highbury House, Theatre-st. Norwich	do.
Sewer, West Marmion-road	North Berwick Commissioners	A. D. Wallace, Commissioners Offices, North Berwick	do.
Private Street Works	Hindley (Lancs.) U.D.C.	A. Holden, C.E. Cross-st. Hindley	do.
Widening Roadway, Arlington	Staines R.D.C.	G. W. Manning, Surv. Ashford, Staines	do.
Warehouse, Nottingham		E.R. Sutton, Archt. Bromley House, Nottingham	do.
Business Premises, Parliament-street, Harrogate	J. Hunter	Bland & Bown, Archt. Harrogate	do.
Workhouse	Tetbury Union Gdns.	W. A. Buye, Tetbury	do.
Houses, Hilderthorpe Hall Estate, Bridlington	J. W. Pitt	Howorth & Howorth, Archt. Cleckheaton	do.
Eight Shops, &c. Westgate, Bradford		F. Wild, Archt. 7, Charles-st. Bradford	do.
Convent and Refuge, Newtownards-road, Ballymacarrett		S. W. Hunter, Archt. 4, Warlag-st. Belfast	do.
Hotel (Dyke), Tebay	M. Croft	J. Hutton, Archt. Kendal	do.
Promenade Extension, West Bank, Widnes		J. S. Sinclair, C.E. Town Hall, Widnes	do.
Schools, Vestries, &c. Stanhope-road, South Shields		T. E. Davidson, Archt. Edinburgh-buildings, South Shields	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in.
*Surveyor and Inspector of Nuisances	Winton U.D.C.	140l. per annum combined	Oct. 14
*Building Inspector	Edmonton U.D.C.	130l. rising to 150l. per ann.	Oct.
*Time and Storekeeper	Rotherhithe Vestry	30s. per week, and House, Gas, and Coal	do.
*Surveyor's Assistant	Garston U.D.C.	110l. per an. to commence	do.
*Engineer, Surveyor, and Sanitary Inspector	Wembley (Mid.) U.D.C.	220l. rising to 280l.	Oct. 19
*General Engineering Assistant	Birkenhead Corpn.	110l. rising to 150l. per annum	Oct. 20
*Building Inspector	Walthamstow U.D.C.	3l. per week	Oct. 28

Those marked with an asterisk (*) are advertised in this Number. ***Competitions.*** p. iv. ***Contracts,*** pp. iv. vi. viii. & xix. ***Public Appointments,*** pp. xvii. & xix.

Dalston.—9, Fassett-sq., u.t. 53 yrs., g.r. 4l. 10s., e.r. 36l. £360

By F. Warman.

Finsbury Pk.—319, Seven Sisters-rd., u.t. 64 yrs., g.r. 30l. 1,950

Highbury.—35, Calabria-rd., u.t. 86½ yrs., g.r. 8l., r. 52l. 580

124, Calabria-rd., u.t. 90 yrs., g.r. 8l. 2s. 525

9, Roseliegh-av., u.t. 81 yrs., g.r. 8l. 10s., e.r. 55l. 570

By C. W. Davies.

Barnsbury.—40, Offord-rd., u.t. 50½ yrs., g.r. 9l., r. 60l. 560

Caledonian-rd.—49 and 51, Bemerton-st., u.t. 42½ yrs., g.r. 12l., r. 68l. 540

Islington.—186, Downham-rd., u.t. 42 yrs., g.r. 5l. 5s., r. 45l. 475

Hoxton.—129, New North-rd., u.t. 21 yrs., g.r. 30l., r. 48l. 110

137, New North-rd., with a timber yard, u.t. 20½ yrs., g.r. 40l., r. 73l. 135

Stoke Newington.—10, Winston-rd., u.t. 61¾ yrs., g.r. 5l. 10s., r. 32l. 340

Hornsey.—4, Beresford-rd., u.t. 93 yrs., g.r. 6l. 6s., r. 34l. 375

By Prickett & Ellis.

Hammersmith.—33, 35, 37, and 39, Bradmore Pk.-rd., u.t. 65 yrs., g.r. 16l. 870

11, 13, 15, and 17, St. Peter's-rd., u.t. 48 yrs., g.r. 20l. £930

26 and 28, Mall-rd., u.t. 66¼ yrs., g.r. 14l., r. 104l. 810

Kensington.—49 and 53, Faroe-rd., f. 835

51, Faroe-rd.; also f.g.r. 4l., reversion in 66 yrs. 490

Chiswick.—192, High-rd., f., r. 120l. 2,990

157, 157A, and 157B, High-rd., f., r. 110l. 2,445

By J. B. Rosevear.

Fulham.—22, Pellant-rd., u.t. 83¾ yrs., g.r. 5l. .. 250

88, Bishop's-rd., u.t. 78 yrs., g.r. 6l. e.r. 34l. .. 320

Kensington.—18, Archel-rd., u.t. 78¼ yrs., g.r. 5l. 340

By Osborn & Mercer.

Westbourne, &c., Sussex.—The Adsdean Park Estate; also The Grange and Stains farms, 600 a. 2 r. 17 p., f. 19,500

Funtington, Sussex.—Four freehold cottages, blacksmith's shop, and 0 a. 1 r. 8 p., r. 25l. .. 620

By Orgill, Marks, & Orgill (at Masons' Hall Tavern).

Southend-on-Sea, Essex.—Hamlet-rd., "The Cliff Hotel," f., with goodwill 33,360

By J. Hart Bridges & Sons (at Masons' Hall Tavern).

Newport, Isle of Wight.—High-st., "The Swan Hotel," f., with goodwill 5,050

By Fleuret, Sons, & Adams (at Masons' Hall Tavern).

Battersea.—Haines-st., "The Prince Alfred" p.-h., profit rent of 35l., u.t. 23¾ yrs., with reversion £1,210

Kingsland-rd.—Nos. 485 to 493 (odd); also 30, 32, 34, Stamford-rd., and "The De Beauvoir Arms" p.-h., u.t. 21 yrs., g.r. 21l., r. 285l. 14s. 2,300

By Messrs. Cobb (at Rochester).

Strood, Kent.—Brompton-lane Field, 2 a. 2 r. 23 p., f. 1,325

Cuxton, Kent.—Arrow Cottage, f. 330

By Langridge & Freeman (at Tunbridge Wells).

Burwash, Sussex.—Pont's Farm, 68 a. 0 r. 22 p., f. 1,000

By Ward & Chowen (at Okehampton).

North Lew, Devon.—A freehold sporting estate, area 906 a. 7,500

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.

PRICES CURRENT OF MATERIALS.

TIMBER.		
Greenheart, B.G. ton	8/0/0	0/0/0
Teak, E.I. ... load	10/10/0	15/10/0
Sequoia, U.S.ft.cu.	1/9/0	2/0/0
Ash, Canada, load	4/5/0	5/10/0
Birch, do.	4/0/0	5/15/0
Elm, do.	5/0/0	6/0/0
Fir, Dantsic, &c..	2/10/0	4/10/0
Oak, do.	2/0/0	4/0/0
Canada	4/0/0	6/0/0
Pine, Canada red	0/0/0	0/0/0
Do. yellow	4/5/0	6/5/0
Lath, Dantsic, fath	4/10/0	5/10/0
St. Petersburg..	5/0/0	6/10/0
Wainscot, Riga, &c., log	4/5/0	6/5/0
Odessa, crown	4/5/0	6/5/0
Deals, Finland and 2 1st std 100	9/10/0	10/0/0
Do. 4th & 3rd ..	9/10/0	10/0/0
Do. Riga	8/0/0	9/0/0
St. Petersburg, 1st yellow	11/10/0	14/0/0
Do. 2nd yellow.	10/10/0	12/0/0
Do. white	9/10/0	11/10/0
Swedish	9/10/0	16/10/0
White Sea	10/10/0	17/15/0
Canada, Pine 1st	18/0/0	24/10/0
Do. do. 2nd	13/0/0	18/10/0
Do. do. 3rd, &c.	6/0/0	9/10/0
Do. Spruce, 1st	8/10/0	10/10/0
Do. do. 3rd and 2nd	7/0/0	8/10/0
New Brunswick	7/0/0	8/0/0
Battens all kinds	5/0/0	16/0/0
Flooring boards, sq., 1 in. prep. 1st	9/6	16/0
Do. 2nd	8/0	13/0
Other qualities—	6/3	7/0
Cedar, Cuba, ft.	/4	/4½
Honduras, &c.	/3½	/4½
Mahogany, Cuba	/5½	/7½
St. Domingo, cargo av.	/5	0/1/3
Mexican, do. do.	/3½	/4
Tobasco, do. do.	/4	/6½
Honduras, do.	/4	/6
Box, Turkey, ton	4/0/0	15/0/0
Rose, Rio	7/0/0	14/0/0
Bahia	6/0/0	12/0/0
Satin, St. Doming.	0/0/5	0/1/0

TIMBER *(continued)*.		
Satin, Porto Rico	0/0/9	0/2/0
Walnut, Italian ..	0/0/3	0/0/7
METALS.		
Iron—Pig, in Scotland ... ton	2/9/2	0/0/0
Bar, Welsh, in London	5/15/0	5/17/6
Do. do. at works in Wales	5/10/0	5/12/6
Do. Staffordshire, in London	6/5/0	7/10/0
COPPER — British cake and ingot	56/0/0	56/10/0
Best selected ..	56/10/0	57/0/0
Sheets, strong..	61/0/0	62/0/0
Chill bars	52/11/3	0/0/0
YELLOW M. L. lb.	5d.	5¼d.
LEAD — Pig Spanish ... ton	13/0/0	0/0/0
English com. bands	13/5/0	0/0/0
Sheet, English 6 lbs. per sq. ft. and upwards ..	14/5/0	0/0/0
Pipe	14/15/0	0/0/0
ZINC — English sheet ... ton	25/10/0	0/0/0
Vieille Montagne	26/10/0	0/0/0
Spelter	22/5/0	0/0/0
TIN—Straits	75/3/9	0/0/0
Australian	75/15/0	76/0/0
English Ingots..	77/15/0	78/15/0
Banca	0/0/0	0/0/0
Billiton	/0/0	0/0/0
OILS.		
Linseed ... ton	17/2/6	0/0/0
Cocoanut, Cochin	27/15/0	0/0/0
Do. Ceylon	22/0/0	0/0/0
Palm, Lagos	21/15/0	0/0/0
Rapeseed, English pale	23/5/0	0/0/0
Do. Brown	21/15/0	0/0/0
Cottonseed ref. ..	14/5/0	15/5/0
Oleine	13/10/0	14/10/0
Lubricating U.S.	0/5/3	0/7/6
Do. Black	0/5/0	0/6/6
TAR — Stockholm barrel	1/5/0	0/0/0
Archangel	0/12/6	0/0/0
Turpentine	22/10/0	2/5/0

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays*. N.B.—We cannot publish Tenders unless authenticated by the name and address of the sender; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under £100 unless in some exceptional cases and for special reasons.]

ALDERSHOT.—For the erection of two shops, &c., Station-road, for Mr. R. S. Blades. Messrs. Friend & Lloyd, architects, Aldershot:—

Martin Wells, & Co.	£2,700	W. Garland	£2,497
W. J. Snuggs	2,639		

AMBLE.—For levelling paving, &c., Albert and other streets, for the Urban District Council. Mr. W. Gibson, surveyor, 31, Queen-street, Amble:—

J. Scott	£313	R. & G. Brown, Amble*	£225 8
A. Douglas	253 10	E. Coulson	219 0

Surveyor's provisional estimate, including 3 per cent. for plans, &c., £232
* Accepted.

BEVERLEY.—For the erection of Registrar's Offices and extension of the County Council Offices, Beverley, for the East Riding County Council. Mr. B. S. Jacobs, architect and surveyor, Lincoln's Inn-buildings, Bowlalley-lane, Hull:—

T. Hodgson	£4,829 3 3	J. R. Foley	£4,163 0 0
J. Constable	4,548 14 9	R. Potts, Beverley*	4,161 1 7
G. Pape	4,239 17 10		

* Accepted.

BROMLEY (Kent).—For the erection of stabling, &c., at "Lomond," South Hill, Bromley, Kent, for Mr. J. A. Shepherd. Mr. W. A. Williams, architect, 84, Chancery-lane, W.C.:—

Gray	£480	Dutholt*	£397
Somerfurd	414		

* Accepted.

DOVER.—For the erection of stables and coachman's cottage at River, near Dover, for Mr. J. L. Rubel, M.D. Mr. A. H. Steele, architect, Dover:—

Smith	£422	Dixon*	£372
Golder	385		

* Accepted.

DOVER.—Accepted for the erection of a cottage at Martin Mill, near Dover, for Mr. O. C. Shawe. Mr. A. H. Steele, architect, Dover:—
Dixon, Dover £280

DOWNPATRICK.—For the execution of water supply works, reservoir, &c., Tannaghmore, for the Union Guardians:—
D. J. Jardine, Belfast £826 6 4

DURHAM.—For the execution of private street works, Neville's Cross, for the Rural District Council. Mr. G. Gregson, surveyor, "Eastwood," Western Hill, Durham. Quantities by the surveyor:—

Section 1.

G. T. Manners	£652 15 11	J. Carrick*	£638 9 0
J. G. Bradley	666 0 0		

Section 2.

G. T. Manners	£156 12 7	J. Carrick*	£154 11 3
J. G. Bradley	155 0 0		

Section 3.

G. T. Manners	£886 10 8	J. G. Bradley*	£817 0 0
J. Carrick	871 9 1		

Section 4.

G. T. Manners	£186 4 11	J. G. Bradley*	£171 10 9
J. Carrick	179 18 0		

[All of Durham].
* Accepted.

EASTBOURNE.—Accepted for the construction of a gasholder tank for the Gas Company. Mr. Henry E. Jones, engineer, Stepney, E.:—
G. W. Bell, Tottenham and Manchester £5,791

CARDIFF.—For the construction of street and sewer works, for the Corporation. Mr. W. Harpur, C.E., Town Hall, Cardiff:—

—	Jas. Rich.	Frank Ashley.	Mrs. Osmond.	W. Ellis, Cardiff.	C. Davies, Cardiff.	Jos. Vevers, Barry.	Thos. Rees, Ely.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Clive-road Sewer	348 4 0	333 2 0	302 12 0	271 8 3	339 7 0	356 3 7	325 12 0
,, Carriageway	192 4 0	288 0 0	201 6 0	241 18 0	220 8 0	346 16 0	292 1 0
,, Footways	620 14 11	690 10 8	642 17 3	629 19 10	628 0 7	636 11 0	642 14 9
Total	1,161 2 11	1,311 12 8	1,146 15 3	1,130 6 1*	1,187 15 7	1,339 10 7	1,168 7 9
Egham-street Carriageway	62 3 3	84 19 7	62 14 3	70 0 0	65 4 2	114 8 10	63 2 3
,, Footways	121 5 0	134 3 10	123 19 9	116 12 6	117 18 7	117 5 11	122 12 3
Total	183 8 3	219 3 5	186 14 9	186 12 6	183 2 9*	231 14 9	185 14 6
Preswyfla-street Carriageway	73 14 6	100 2 10	73 8 0	82 9 0	76 9 8	132 11 4	73 11 0
,, Footways	150 15 4	174 1 3	160 9 0	151 3 2	152 5 1	182 3 9	158 15 0
Total	230 9 10	274 4 1	233 17 0	233 12 2	228 14 9*	314 15 1	232 6 0
Purbeck-street Carriageway	45 1 3	57 18 9	45 1 0	51 10 0	47 4 2	81 10 10	45 1 3
,, Footways	102 0 5	111 5 2	104 2 0	99 13 0	99 0 11	118 6 1	103 12 0
Total	147 1 8	169 3 11	149 3 3	151 3 0	146 5 1*	199 16 11	148 13 3
Leckwith-road Sewer	273 5 0	244 15 0	240 0 0	181 1 0	259 15 0	255 15 0	216 10 0
,, Street Works	342 4 4	299 0 10	280 5 1	251 8 10	261 1 9	356 12 2	266 13 9
Total	612 9 4	543 15 10	520 5 1	432 9 10*	520 16 9	612 5 0	483 3 9

* Accepted.

FARNHAM (Surrey).—Accepted for the erection of new infirmary, Farnham Union. Messrs Friend & Lloyd, architects, Aldershot:—
W. Smith, Farnborough (amended tender) £12,510

HUDDERSFIELD.—For erecting ten houses, Deadwaters, for the Huddersfield Industrial Society, Limited. Mr. J. Berry, architect, Huddersfield:—

Masonry.—Mark Brook, Leeds-road, Huddersfield..
Joinery.—George Ainley, Crossland Moor, Huddersfield
Plumbing.—Ernest Mitchell, Milnsbridge, Huddersfield
Plastering.—Broadbent Bros., Moldgreen, Huddersfield
Painting.—Haigh & Shaw, High-street, Huddersfield
Slating.—T. B. Tunnacliffe, West Parade, Huddersfield
Concreting.—John Cooke, Lttle Royd, Huddersfield
} Total £2,460

HULL.—For the erection of an art gallery, &c., over the museum at the Royal Institution, Albion-street, Hull, for the Hull Literary and Philosophical Society. Mr. B. S. Jacobs, architect, Hull:—

Hockney & Liggins	£3,549 0 0	Colley & Levitt	£3,298 0 0
M. Harper	3,509 0 0	W. G. Bray	3,269 10 0
T. Goates	3,483 0 0	Executors of T. Southern	3,162 12 3
Blackburn & Son	3,475 0 0	G. Jackson & Sons	3,144 0 0
E. Good & Son, Ltd.	3,400 0 0	J. R. Woods*	2,712 0 0

[All of Hull.]
* Accepted.

HULL.—For alterations and extensions to the Beverley-road works of Messrs. Blundell, Spencer, & Co., Limited, Hull. Mr. B. S. Jacobs, architect, Hull:—

G. Jackson & Sons	£808 12 6	M. Harper	£764 12 0
Hockney & Liggins	750 9 0	F. Blackburn & Son*	708 19 0

[All of Hull.]
* Accepted.

HULL.—For the erection of club premises, Carr-lane, for the Directors of the Hull Constitutional Club Company, Ltd. Mr. B. S. Jacobs, architect, Bowlalley-lane, Hull:—

W. G. Bray	£5,878 0 0	Colley & Levitt	£5,098 8 5
F. Blackburn & Son	5,468 17 0	J. R. Wood	4,955 0 0
T. Goates	5,464 0 0	E. Good, Ltd.*	4,898 8 5
Hockney & Liggins	5,148 8 5		

* Accepted.
[All of Hull.

KEIGHLEY.—Accepted for additions to house, Victoria-road, Mr. J. Haggas, architect, North-street, Keighley:—

Masonry.—Timothy Hird, King-street, Keighley ....
Joinery.—Joseph Hartley, Oakworth, near Keighley
Slating.—Wm. Thornton, Bingley
Plastering.—Joseph King, Russell-street, Keighley ..
Plumbing.—Wm. Bottomley, Bow-street, Keighley ..
} £471

LEEDS.—Accepted for the extension of Kirkgate Market. Mr. Thomas Hewson, C.E., Municipal Buildings, Leeds:—

Ironfoundry.—Cross & Cross, Walsall	£1,240 0 0
Carpentry and Joinery.—A. Braithwaite & Co., Leeds	1,744 17 10
Bricklaying.—Wm. Wilson & Sons, Leeds	1,004 4 0
Masonry.—A. Braithwaite & Co., Leeds	528 3 1
Plumbing and Glazing.—W. & C. Barrand, Leeds	639 0 0
Slating.—James Season, Leeds	324 16 0
Smithing.—Cross & Cross, Walsall	4,450 0 0
Excavating.—Wm. Wilson & Sons, Leeds	276 15 0
Painting.—Jenkins, Tollerton & Co., Leeds	189 11 3
	£10,397 7 8

LEEK.—For the erection of the Leek Municipal Science and Technical School and County School. Messrs. W. Sugden & Son, architects, Leek and Hanley. Quantities by the architects:—

T. Godwin	£5,535 0	J. Fielding	£4,948 0
Jas. Heath	5,300 0	S. Warburton	4,880 83
C. Cornes & Sons	5,150 0	S. Salt	4,783 0
Parnell & Sons	5,114 0	T. Grace, Leek*†	4650 0

Woodwork only.

Heath & Lowe	£1,750	Matthews Bros.	£1,340

Plumbing, &c., only.

Stevenson	£4 17	M. Carding	£446 0
Phillips	482 0		

* Accepted.
† Reduced by change in estimate of plumbing, &c., to £4,613 3.

LONDON.—For erecting the first portion of a new building in Throgmorton-street and Throgmorton-avenue, City, to be used as a restaurant, shops, and offices, for Messrs. J. Lyons & Co., Ltd. Mr. Charles Reilly architect, 23, St. Swithin's-lane, E.C. Quantities by Messrs. Gardiner & Theobald, 110, Gt. Russell-street, W.C.:—

Hall, Beddall, & Co,	£42,265	Holland & Hannen	£39,360
Ashby & Horner	41,920	Foster & Dicksee	39,220
G. Trollope & Sons	41,310	Barnsley & Son	38 960
J. Mowlem & Co.	40,946	Colls & Sons	38,696

LONDON.—For foundations of new police station, Cannon-row and extension of chief offices at New Scotland Yard adjoining, for the Receiver for the Metropolitan Police District. Mr. J. Dixon Butler, Police Surveyor. Quantities by Mr. W. H. Thurgood:—

Nightingale	£27,347	Colls & Sons	£20,335
Patman & Fotheringham	22,460	Lathey Bros.	20,300
Mowlem & Co.	22,309	T. Parker	19,970
Holloway Bros.	22,235	Cubitt & Co.	19,890
Bywaters & Sons	21,740	Ashby & Horner	19,660
Sydney Hart	21,550	Lawrance & Sons	19,550
Thompson	21,541	Greenwood	—
Dove Bros.	21,455	J. Carmichael	—
Higgs & Hill	21,240	Scrivener & Co.	—
Grover & Son	20,596	Trollope & Sons	—
Holland & Hannen	20,580		

LONDON.—For repairs and new drainage to the "Hat and Feathers" public-house, Sumner-street, Southwark, for Messrs. Chandler & Co. Mr. Joseph G. Needham, architect, 18, Lower Clapton-road, N.E.:—

A. & T. Wilson	£233	R. Ridgeway & Sons, Hackney (accepted)	£175

LONDON.—New drainage works for Messrs. W. Clarke & Sons, 168, Clerkenwell-road:—

Morland	£184	J. W. Heeps	£157
Hawtrey	170		

LONDON.—For rebuilding Mr. Hugh Reed's drapery premises Powis-street, Woolwich:—
Chapman ..... Accepted at schedule.

LONDON.—For painting and decorative works at the Abbey Mills Pumping Station, &c., for the London County Council. Quantities supplied:—

J. Kybett	£4,872 17 10	F. W. Harris	£2,251 0 0
Vigor & Co.	2,812 0 0	E. Proctor	2,172 14 0
E. F. Foliey	2,774 0 0	A. H. Inns	2,154 9 4
D. Gibbs & Co.	2,558 10 7	A. J. Wick	2,092 12 10

LOWER EDMONTON.—For alterations and additions and new stables to the "Cross Keys" public-house, for Mr. C. Gibbons. Messrs. A. Drewe-Mercer and A. E. Taylor, joint architects, Granville House, Arundel-street, Strand, W.C.:—

	House.	Stables.
A. Porter	£6,697	£3,692 — £10,389
J. Peerless	6,450	3,640 — 10,090
J. Weibking & Son	6,375	3,620 — 9,995
W. Gregor & Son*	6,525	3,469 — 9,994
W. Johnson & Co.	6,250	3,296 — 9,546
A. Monk	5,923	3,210 — 9,133
S. & J. Redhouse	5,740	3,185 — 8,925
C. Ansell, Lambeth†	5,485	3,242 — 8,727

* Too late. † Accepted.

MIDDLESBROUGH.—For new printing works, Short-street, Middlesbrough, for Mr. W. Appleyard. Mr. W. G. Roberts, architect, 61, Albert-road, Middlesbrough. Quantities by Mr. F. Cartwright, Sheffield:—

Full Tenders.

W. A. King	£2,443 0 0	Perks & Son	£2,129 8 14
Joseph Howe & Co.	2,503 0 0	Allison Bros.*	2,063 0 0

Excavator, Concrete, Bricklayer, and Mason's Work.

W. Pounder	£1,356 1 2	John Davison	£1,026 4 6
J. Johnson	1,139 15 0	D. Doughty	986 6 6
Jos. Coates	1,034 16 9		

Slating.

J. & R. Marscall	£84 14 0	J. Harrison	£80 14 0
W. B. Robinson	83 19 0	J. Davison	70 18 1
W. Tyreman	83 2 0		

Carpentry an d Joinery.

R. Sweeting	£480 13 3	J. Davison	£410 14 11
W. A. King	426 0 0	W. Thompson	379 9 6
Hudson Bros.	421 6 0		

Plastering.

G. E. Jarran	£92 10 0	J. Johnson	£67 13 2
John Davison	86 6 6	S. W. Treppass	57 17 8
J. R. Smiles	78 18 0		

Ironfounding and Smithing.

R. Sweeting	£335 7 1	Hudson Bros.	£242 14 0
W. Thompson	289 19 0	Baker Bros.	225 10 1
J. Davison	268 7 1		

Plumbing, Glazing, and Gasfitting.

Baker Bros.	£185 7 0	G. Ripley	£174 8 2
Curtis & Bowman	181 16 0	J. Barwick	163 19 9

Painting.

W. Ridgway	£18 14 3	W. L. Taylor & Sons	£23 14 0
A. Lewis	25 10 3	J. H. Hill	23 3 4
J. Scott & Co.	25 8 0	E. Turner	19 8 10

* Accepted.

MEXBOROUGH (Yorks).—For sewering, &c, Simpson-place, for the Urban District Council. Mr. G. F. Carter, C.E., Council Offices, Mexborough :—

W. Hobson	£515 8 6	G. Eyre, Sheffield*	£349 15 6
J. Rothery	389 10 0	* Accepted.	

MIDDLESBROUGH.—For alterations to chapel, Brougham street. Mr. W. G. Roberts, architect, 61, Albert-road, Middlesbrough :—

Full tender.

Allison Bros.	£295 0	W. A. King	£190 0
W. Thompson	202 5		

Joinery.

W. A. King	£120	Hudson Bros., Middlesbrough (accepted)	£104

Brickwork.

W. Pounder	£59 16	D. Doughty (accepted)	£43 2

NANTWICH.—For the execution of water-supply works, Spurstow, for the Rural District Council. Mr. J. A. Davenport, C.E., 152, Hospital-street, Nantwich :—

Pipe Laying.

Rowland	£389 0 0	Dodd	£101 5 0
Jowett	303 19 0	Dale	187 9 6
Small & Co.	237 16 6	Dodd	179 11 6
Birchall	236 0 0	T. Wood, Smallmain-road, Crewe*	164 10 0
Gresty	193 0 0		
Newbale	191 15 0		

Pipes and Specials.

D. Parsons, Brierley Hill.*

Fittings and Valves.

Blakeborough & Co., Brigham.*

* Accepted.

SHEFFIELD.—For additions to St. John's Church, Chapeltown. Mr. W. J. Sykes, architect, Hoyland, near Barnsley. Quantities by architect :—

Masonry.—R. Marsden, Chapeltown, near Sheffield	£931 0 0
Joinery.—G. Cook, Hoyland Common, near Barnsley	296 12 0
Slating.—G. Calvert, Ecclesfield, near Sheffield	77 17 0
Plastering.—J. MacPartlain, Hoyland, near Barnsley	44 0 0
Painting, &c.—J. Snowden & Son, Market-street, Barnsley	133 10 0
Total	£1,482 19 0

SOUTHEND-ON-SEA.—For the erection of a small house in Preston-road, Westcliff, Southend-on-Sea, for Mr. J. Parker Ayers. Messrs. Clark & Hutchinson, architects, 23, John-street, Bedford-row, W.C. :—

J. L. Scheefer	£987	R. Gooch	£840

TAMWORTH.—For the supply of 3,500 tons broken granite, for the Rural District Council. Mr. H. J. Carson, C.E., 22, Church-street, Tamworth :—

	Average price per ton. s. d.
Barlow & Son, Glascote, Tamworth*	6 0
Nugent & Sons, Tamworth*	8 2½
Mountsorrel Granite Co.	9 0
C. Abel	6 6½
Narboro' and Enderby Granite Co.	7 6
Rowley Hall Granite Co.	7 7½
Ford & Hudson	7 5½
Ellis & Everard	8 3
W. H. Murray & Co.	6 5½

* Accepted.

TUNBRIDGE WELLS.—For the erection of the lower portion of St. John's-road Free Church, comprising lecture hall, class rooms, kitchen, offices, &c. Mr. H. Y. Coley, architect. Quantities by Mr. H. Elwig :—

Strange & Sons	£2,446	J. Jarvis	£2,089
W. & F. Penn	2,344	J. Smith	1,902
J. Crates	2,280	J. Marshall	1,897

WALTHAMSTOW.—For the erection of school buildings, Queen's-road, for the School Board. Mr. W. A. Longmore, architect, 7, Great Alie-street, London, E. :—

J. A. Reed	£22,655	H. J. Carter, Grays, Essex*	£20,210
C. Gray Hill	20,970		
Merridew & Wort	20,274		

* Accepted.

WHITLEY (Northumberland).—For widening, &c., Marine Avenue, for the Urban District Council. Mr. J. P. Spencer, C.E. Newcastle-on-Tyne :—

Geo. Maughan, Jarrow-on-Tyne, schedule of prices.

REBUILDING SHOPS, POWIS STREET, WOOLWICH.—In the list of tenders for this work, printed in our last issue, it was stated that the tender of Mr. Cheshire had been accepted. This was an error, for which we are not responsible The tender of Mr. J. Chapman, Liverpool-road, N., was accepted at £4,159.

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W. E. W., J. W. (Below our limit).—M. & B., B. B, J. F. W. (Amounts should have been stated).—W.C. (We do not think your suggestion can be regarded as coming within the region of practical building operation).

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Date, 1898.	Lecturer.	Subject.
Thursday, Oct. 13th	Prof. T. ROGER SMITH, F.R.I.B.A.	SITE, FOUNDATIONS, AND SANITARY REQUIREMENTS Sanitary Precautions as to Healthiness of Site, &c. Construction of Foundations.
Thursday, Oct. 20th		Sanitary Arrangements of Buildings, the Construction of Water Closets, &c. and Plumbers' Work. The Essentials and Details of Good Drainage.
Thursday, Oct. 27th	Prof. BANISTER FLETCHER, F.R.I.B.A.	SANITARY CONSTRUCTION, WARMING, AND VENTILATION. The Properties and Qualities of Bricks, Stone, Timber, Limes, and Cements. Methods of Bonding Brick and Stone Work. The Construction of Walls, Floors, and Roofs, with special reference to their Warmth and Dryness. Hollow Walls.
Thursday, Nov. 3rd		Ventilating and Warming Buildings.
Thursday, Nov. 10th	JAMES BARTLETT, M.S.A. Demonstrator, King's College.	SETTING OUT WORK AND BY-LAWS. Principles of Calculating Areas, &c. Knowledge of the Acts of Parliament relating to Buildings, Model By-Laws, &c.

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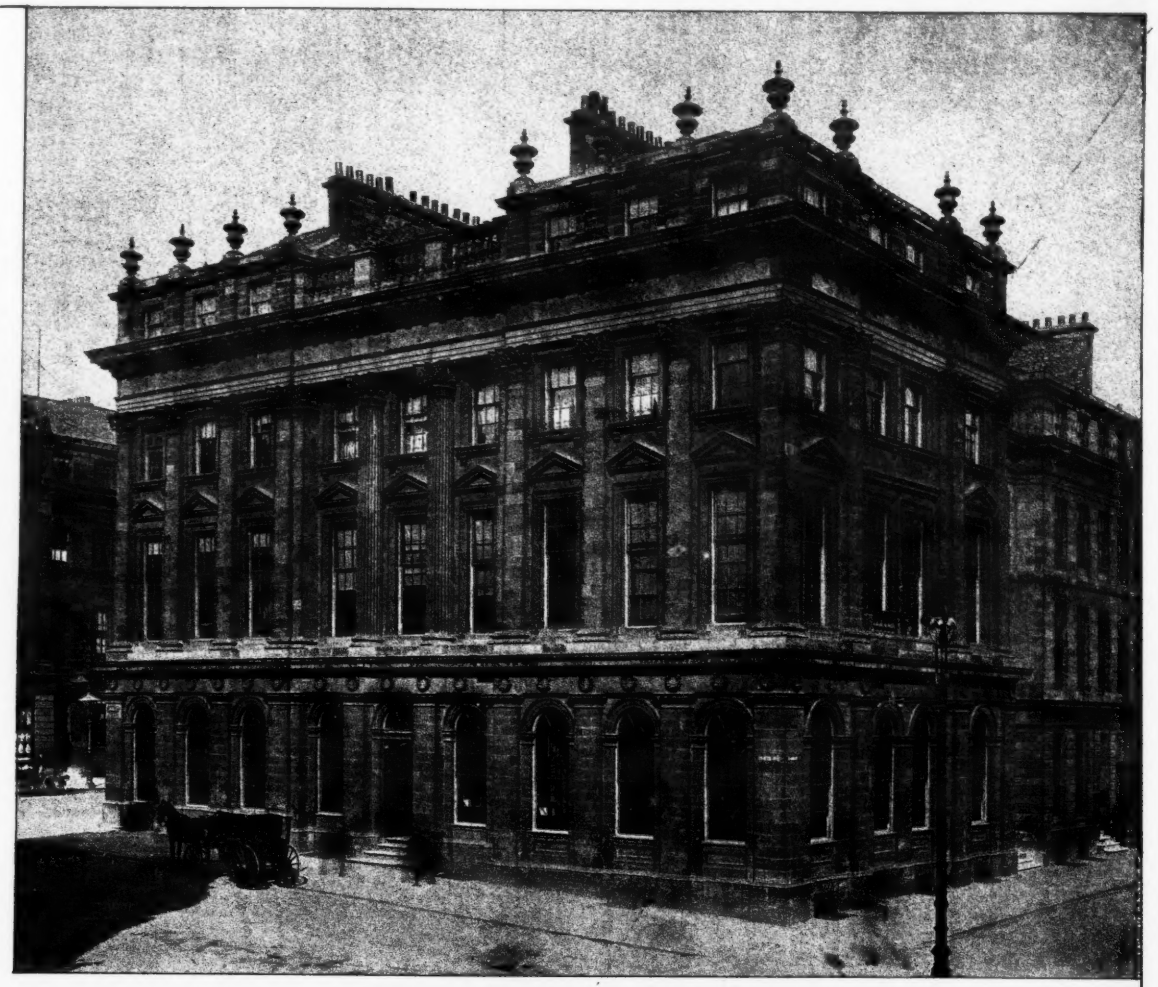
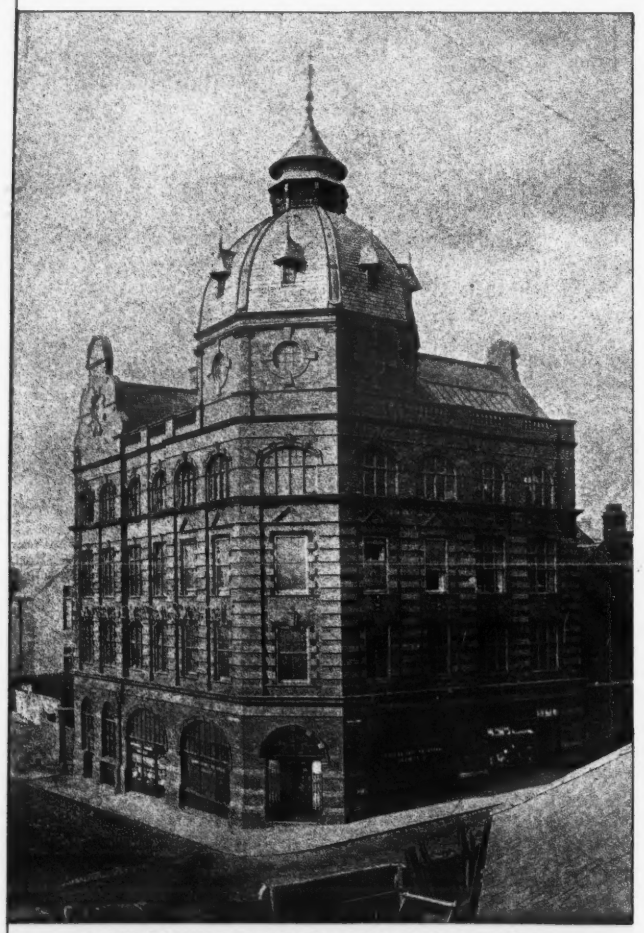
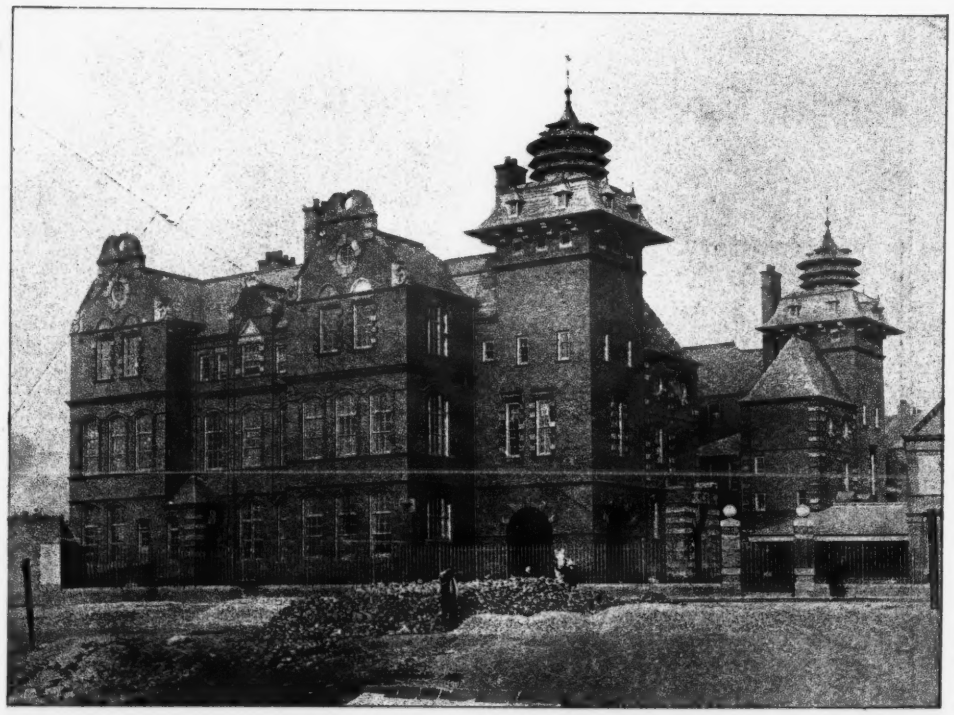


LAMBTON'S BANK (The late Benjamin Green).

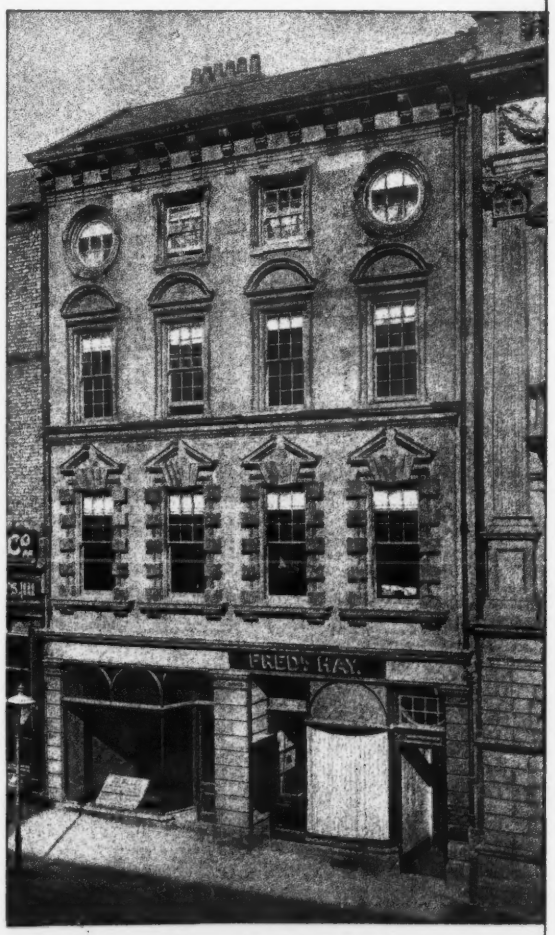
CENTRAL EXCHANGE BUILDINGS (The late Benjamin Green).



CO-OPERATIVE PRINTING SOCIETY'S PREMISES
(Mr. F. W. Rich).



THE OUSEBURN SCHOOLS (Mr. F. W. Rich).



BUSINESS PREMISES, PILGRIM STREET
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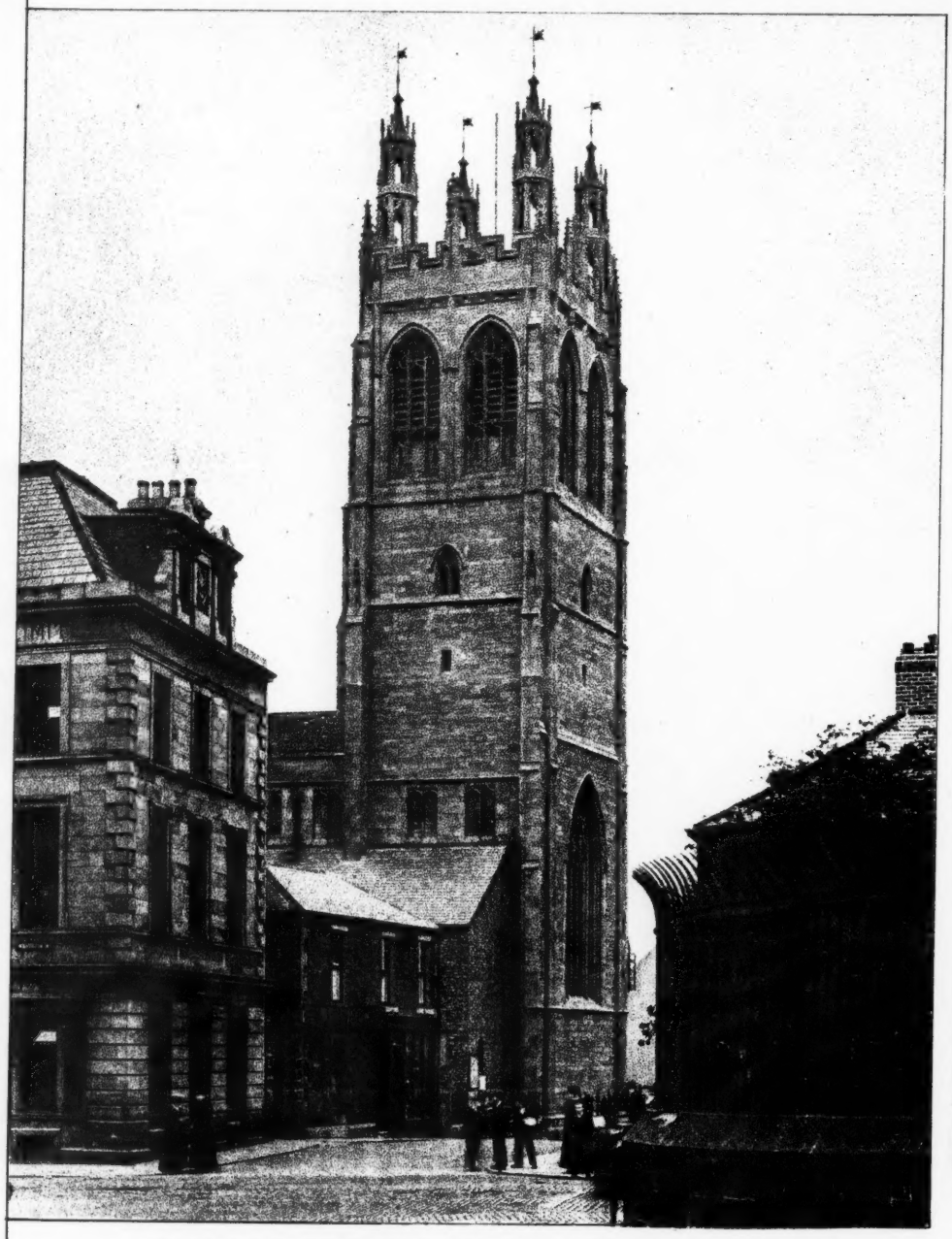
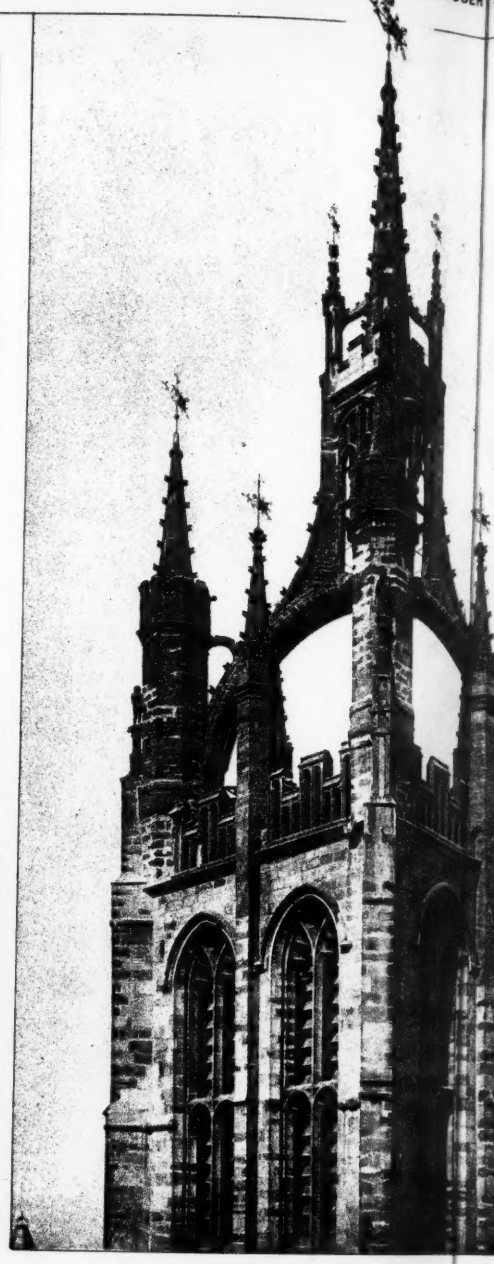
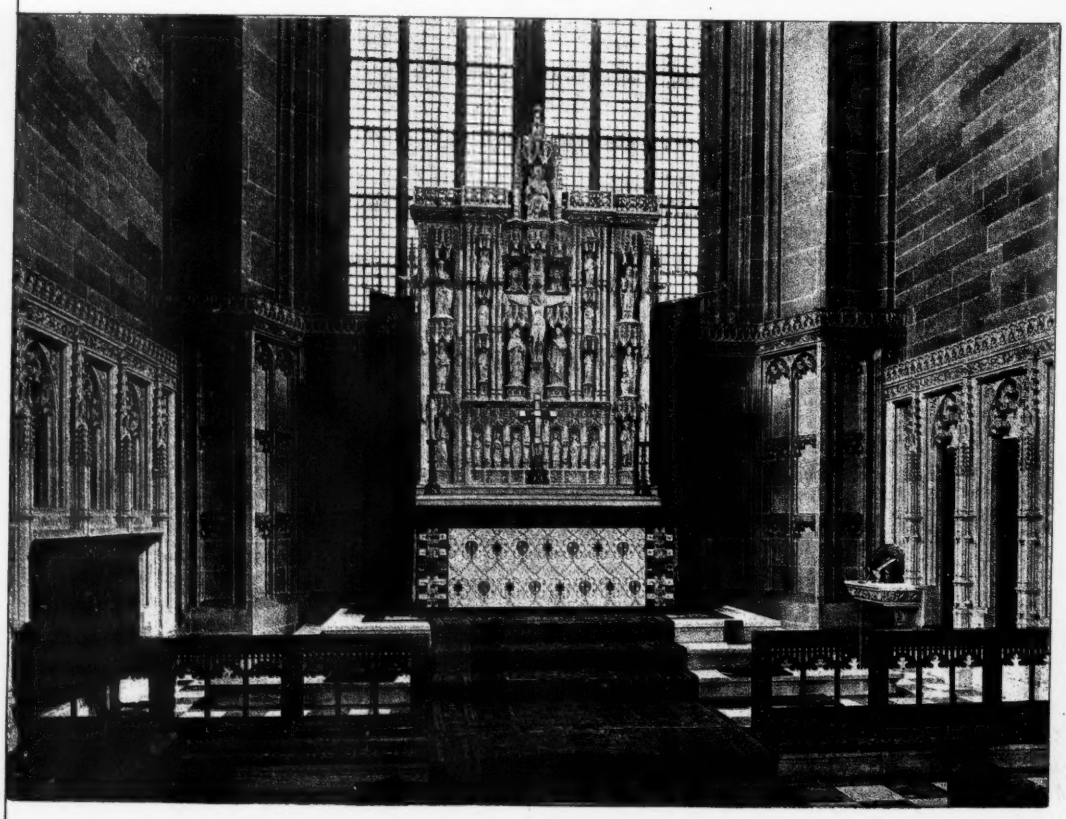


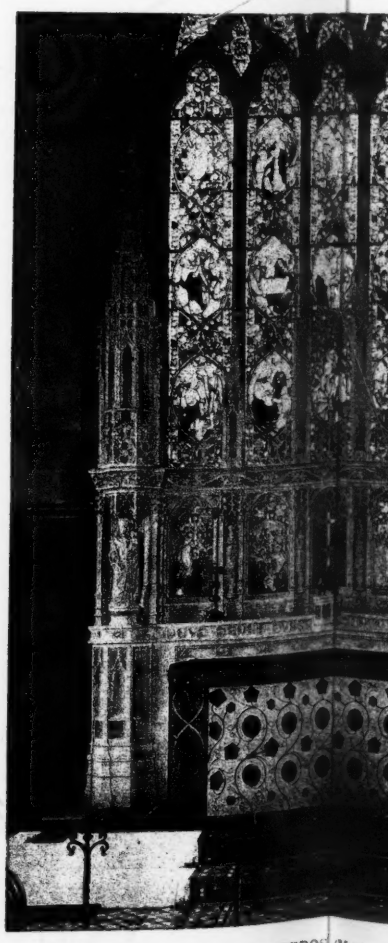
ST. MATTHEW'S CHURCH TOWER (MESSRS. HICKS & CHARLEWOOD).



THE LANTERN; ST. NICHOLAS.



ST. MATTHEW'S CHURCH; CHANCEL AND REREDOS (MESSRS. HICKS & CHARLEWOOD).

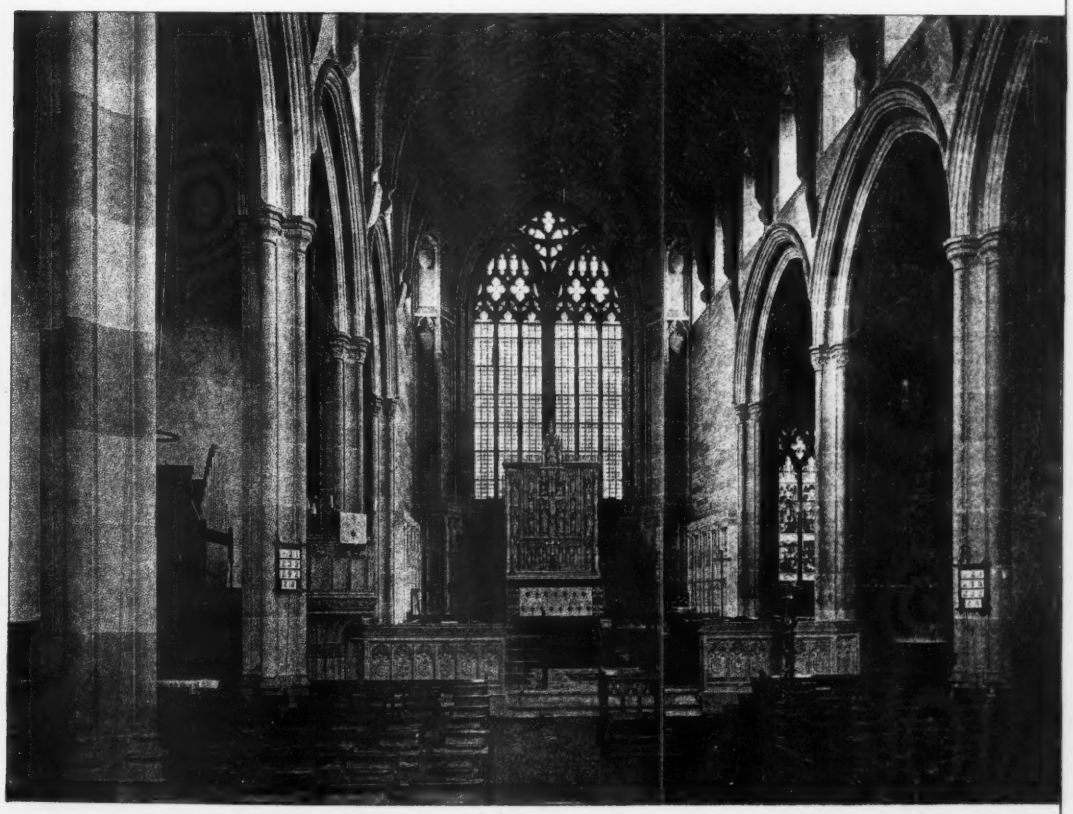


ST. MARY'S CHURCH; REREDOS (MESSRS.

; ST. NICHOLAS.

ST. MICHAEL'S, WESTMORELAND ROAD (Messrs. Dunn, Hansom, & Fenwicke).

; REREDOS (Messrs. Hicks & Charlewood).



ST. MATTHEWS CHURCH; NAVE LOOKING EAST (Messrs. Hicks & Charlewood).

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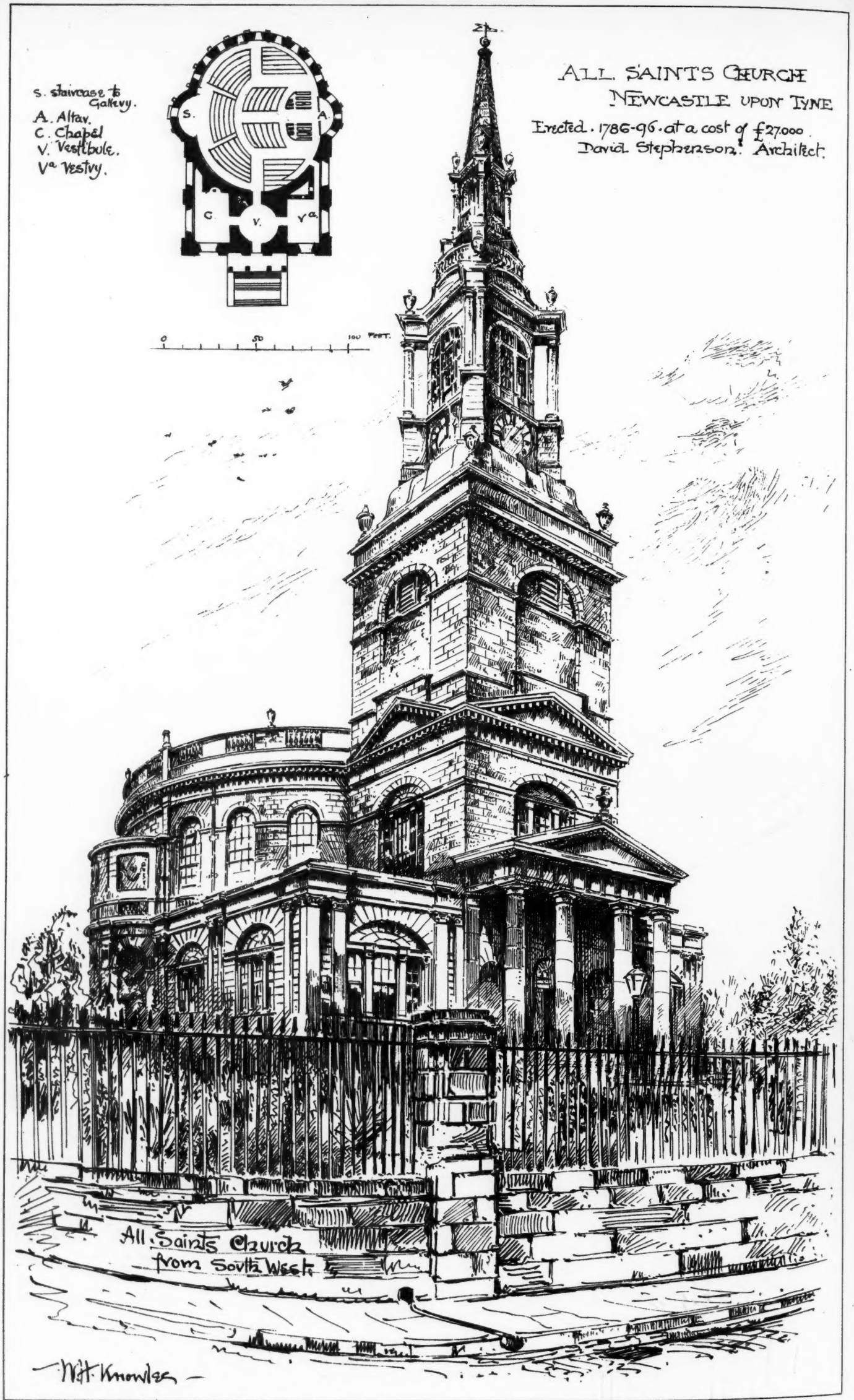

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BUSINESS PREMISES. WESTGATE ROAD. NEWCASTLE on TYNE. Armstrong & Knowles Archts. Newcastle.

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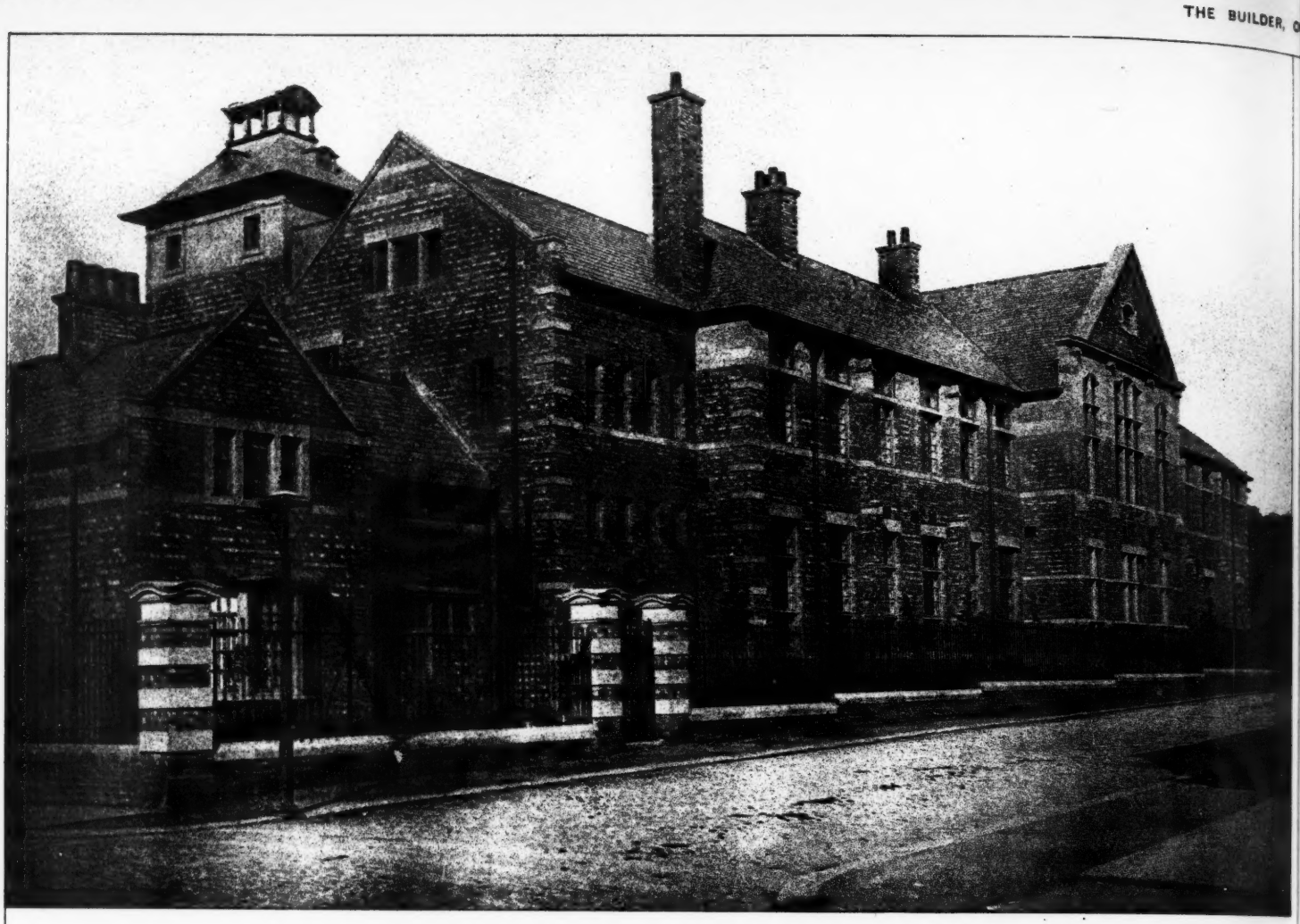
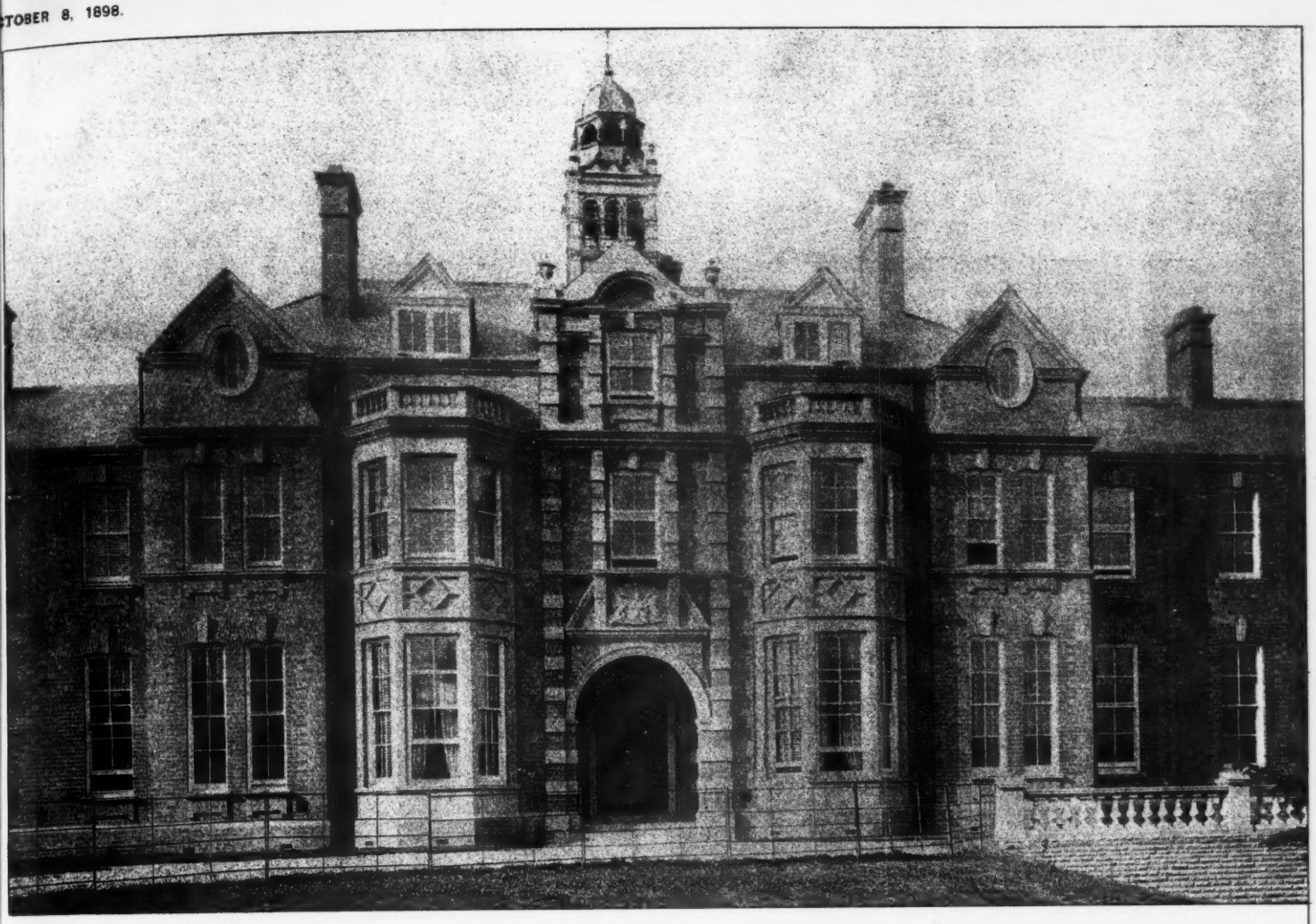


SANDYFORD ROAD BOARD SCHOOL (Messrs. Armstrong & Knowles).

BUSINESS PREMISES, NEWGATE STREET (Mr. E. Shewbrooks).

NORTHERN ASSURANCE COMPANY'S OFFICES (



HOME FOR INCURABLES (Mr. E. Shewbrooks).

IPANY'S OFFICES (The late R. J. Johnson).

GUILDHALL CHAMBERS (Mr. E. Shewbrooks).

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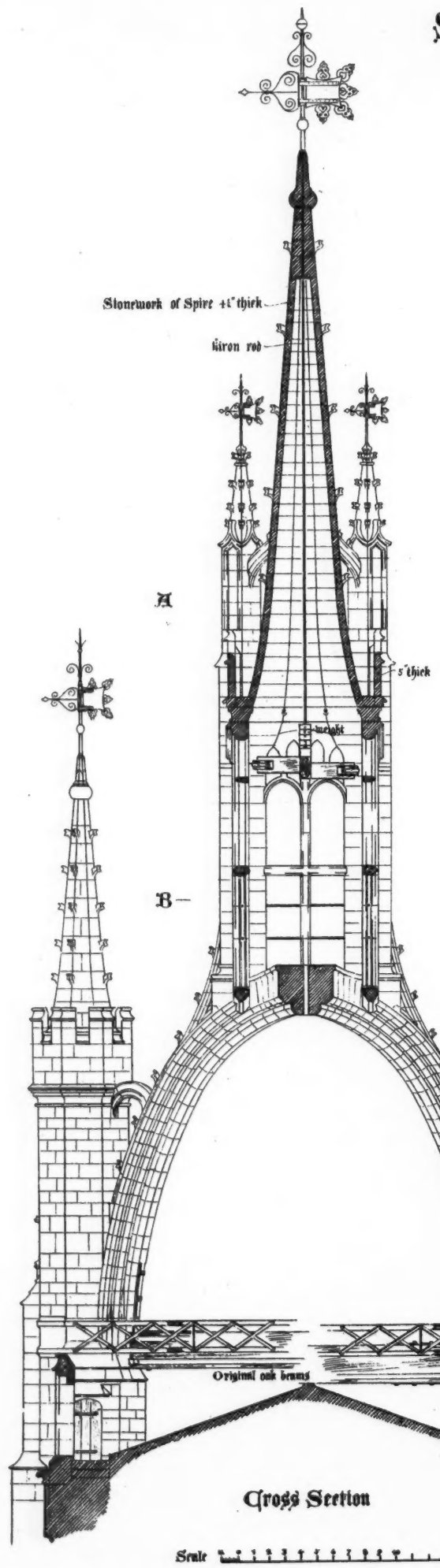
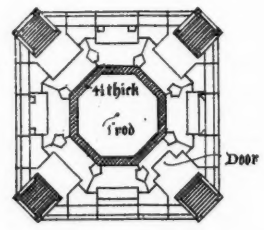
S. Nicholas Cathedral, Newcastle-on-Tyne.

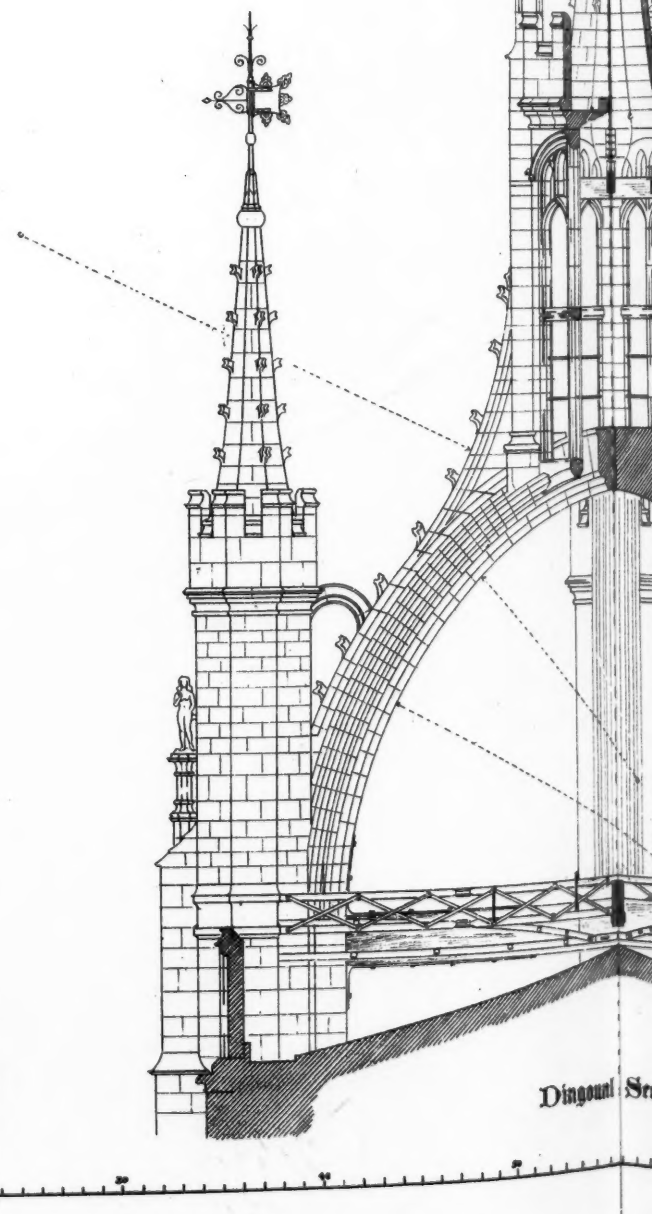
Measured drawing of Spire. Scale, quarter inch to the foot.



Cross Section

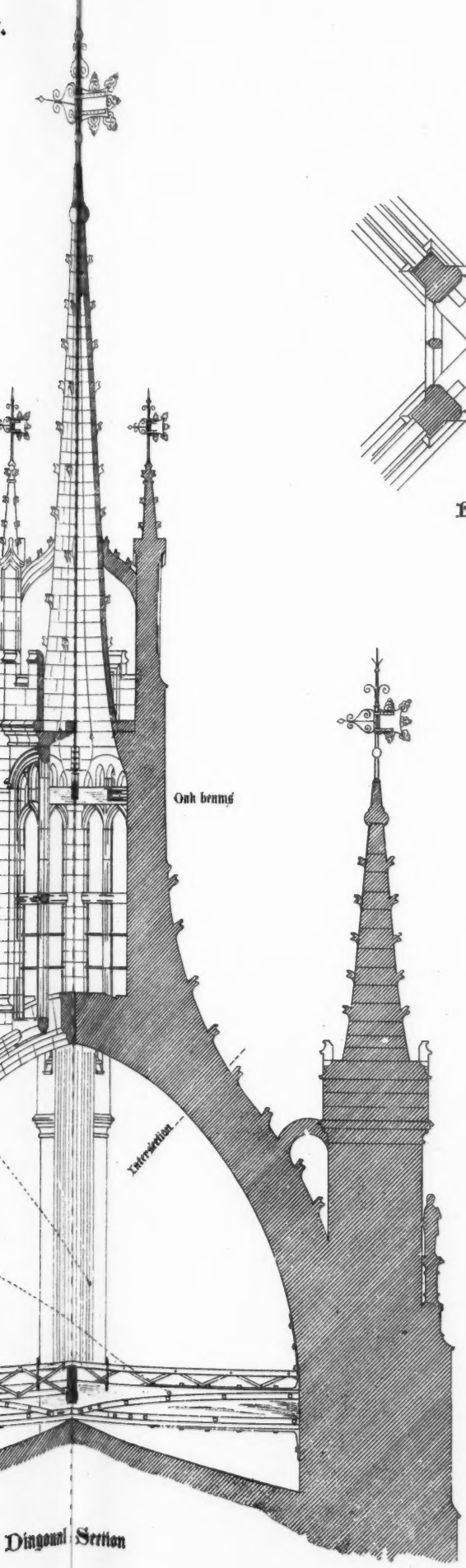


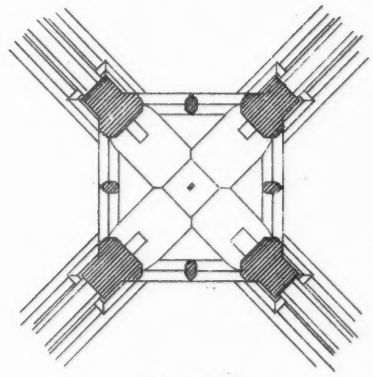
Plan at A.



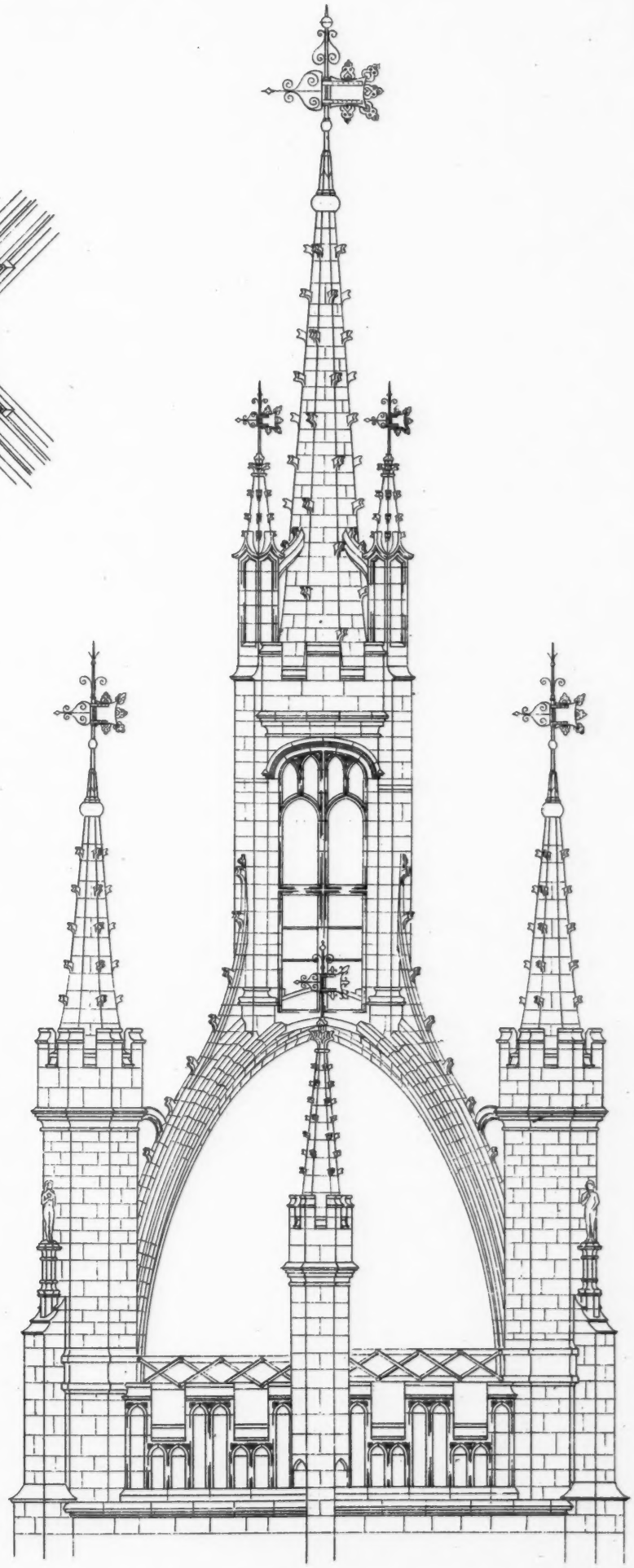
Diagonal Sec

Scale





Plan at B.



North Elevation

Oliver and Leeson Archts
Newcastle on Tyne
Oct 1895.

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